MAY 23 1950

May 22, 1950

STEEL

The Magazine of Metalworking and Metalproducing

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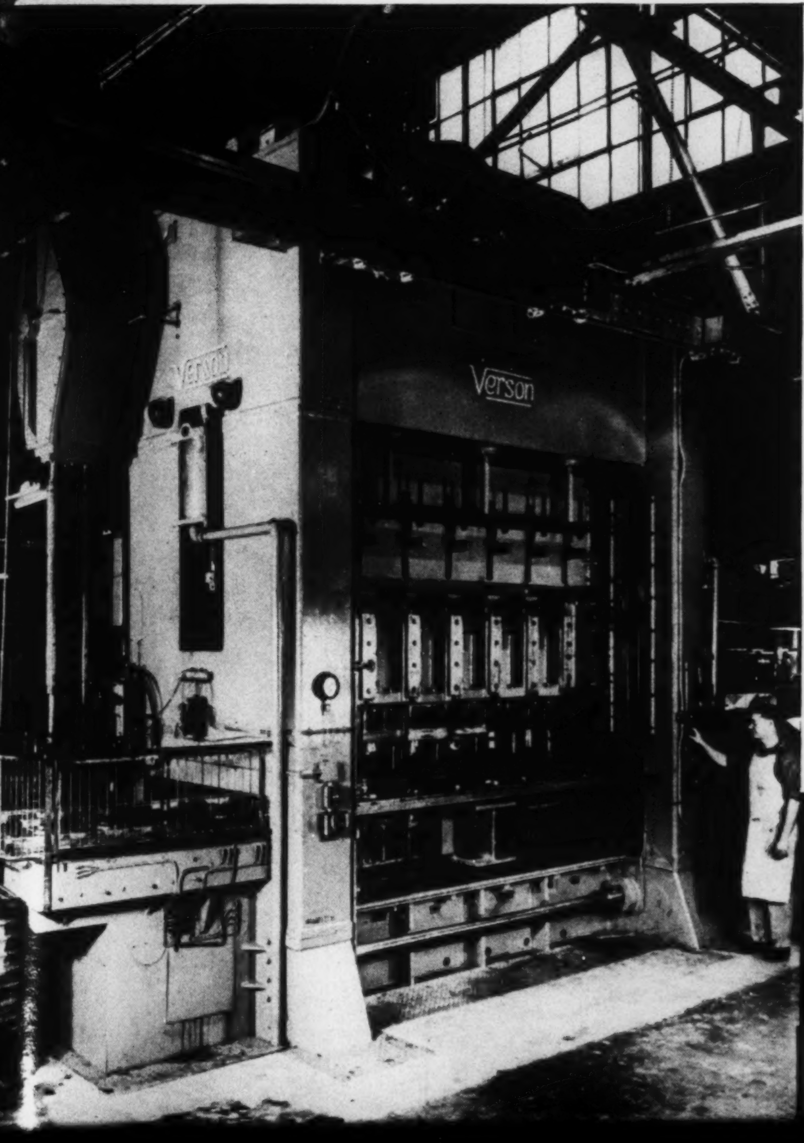

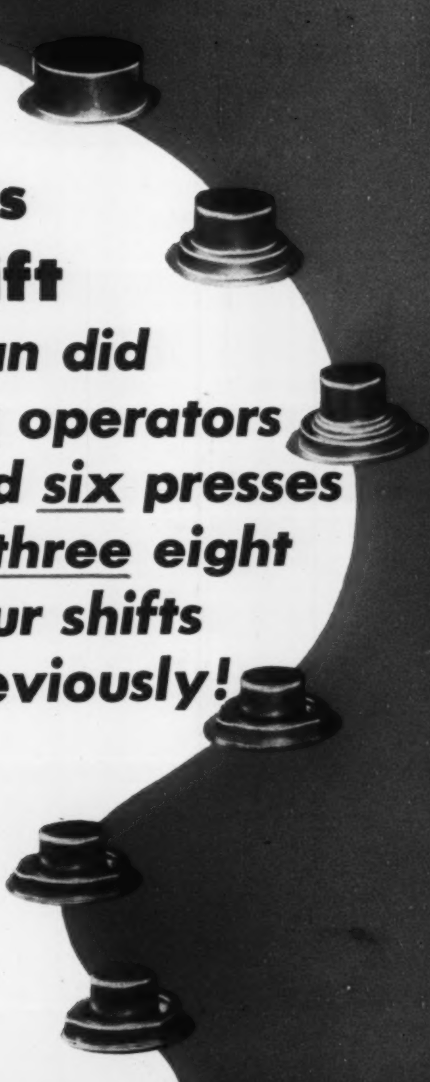

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One operator produces more parts in one eight hour shift

than did six operators and six presses in three eight hour shifts previously!

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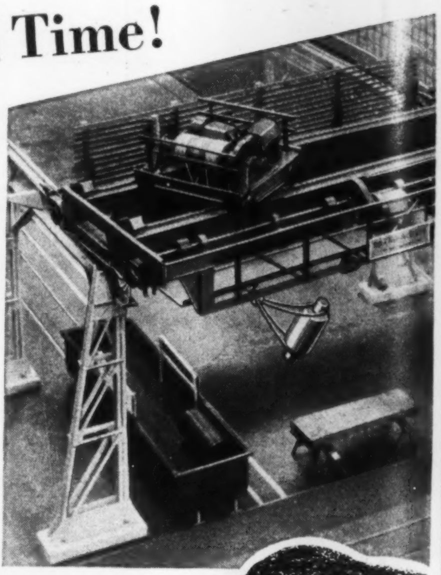
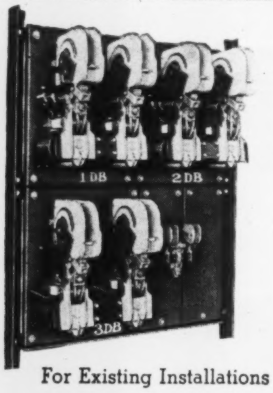
Couldn't Reach the Foot Brake in Time!

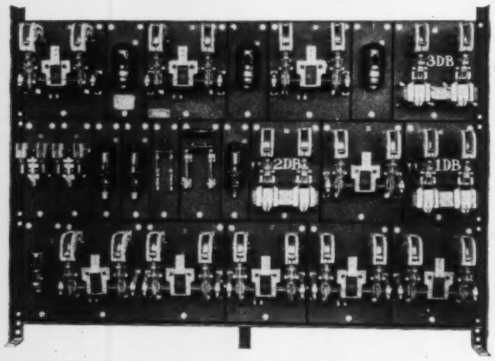


Operators, intent on maintaining a high rate of production, depend almost entirely on the reverse-power (plugging) method of control for a quick stop, using the foot brake for parking the crane or holding it against drift. BUT, at the instant of plugging, *should power fail* or the *overload relays trip*, the operator throws the master handle to reverse. Nothing happens . . . he moves the handle back and forth . . . there is still no response . . . he realizes power has failed. His foot reaches for the brake pedal —*but too late*—too late to avoid a collision with another crane on the same runway . . . to avoid crashing into or going over the end bumpers.

STOP Hi-Speed Cranes with the Same Motors that Drive Them



For Existing Installations



COMPLETE Duplex CONTROLLER with EC&M Dynamic Braking Bridge Stop Control including Automatic Deceleration Feature.

Now these dangers can be eliminated by the addition of simple equipment. Upon power failure, the EC&M *Dynamic Braking* Bridge Stop Control *automatically* converts the motors into self-excited generators to provide retardation quickly. No additional collector bars are required—no outside source of power.

This control is equally advantageous for larry or transfer cars—for man trolleys of ore and coal bridges, charging machines, soaking pit cranes, etc. On icy, slippery rails, wheels do not slide to a stop—instead, this system releases and re-applies retardation to give a quicker stop than when the wheels remain locked.

Dynamic braking is fast—equally effective in either direction—EC&M's deceleration feature *maintains* better braking throughout the entire stopping period. Bulletin 921-6.0 gives complete facts. Write for a copy.

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When Overload Relays Trip

SELECTIVELY APPLIED { By the Operator
By End-zone Limit Switches

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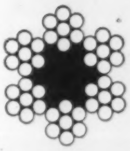
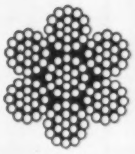
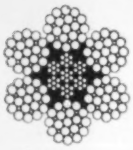
Whatever the job



6x7 rope is made with 7 wires in each of 6 strands around a fiber core or a steel core. It may be bright or galvanized steel, stainless steel or monel metal. Uses are for haulage, guying, sand lines, core barrel lines, rigging, controls, etc.

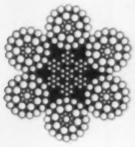


7x19 is made with 7 strands of 19 wires each, one strand forms the core. It is widely used for corrosion-resisting wire rope of galvanized steel, stainless steel and monel metal. Widely used for aircraft controls and for miscellaneous hoisting and controls.

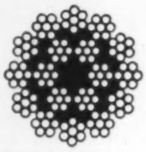


6x19 classification is made with wire combinations varying from 16 to 26 wires in each of 6 strands. Supplied PREformed or non-PREformed, Lang Lay or Regular Lay, with fiber core, or steel core in bright and galvanized steel, stainless steel and monel metal. It is one of the most widely used ropes for general hoisting, cranes, excavating equipment, haulage, mining, logging and rotary drilling. Illustrated is a cross-section of 6x19 filler with I.W.R.C.

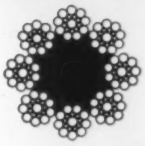
select the right wire rope for your equipment from



6x37 group has various types with wire combinations ranging from 26 to 46 wires in each of 6 strands. Supplied PREformed or non-PREformed, Lang Lay or Regular Lay, with fiber core or steel core. It is extremely flexible and has many uses for hoists, ladle cranes, coal cutting machines, winches, dredges, excavating equipment, etc. Illustrated is a cross-section of 6x41 I.W.R.C.



18x7 is made as illustrated with 18 strands of 7 wires each and supplied PREformed. It is a non-rotating "Kilindo" rope made by combining two opposing lays of rope. Its principal use is for hoisting with a single line to overcome rotating or spinning of the load. It is desirable for small shop and warehouse electric hoists, and for sewer, subway and mine shaft work.



8x19 is an extra flexible rope made in various wire combinations. It is used in iron and special traction grades for passenger and freight elevator service, and in Monarch Whyte Strand Improved Plow Steel for many and varied purposes where the rope is not subjected to heavy crushing loads. Illustrated is 8x19 Seale Special Traction Elevator Rope.

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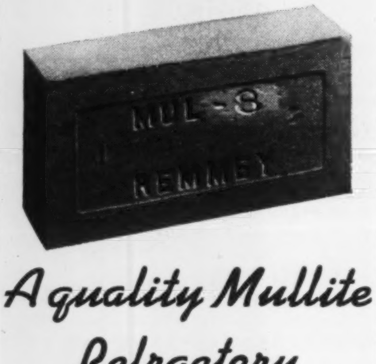
788

MUL-8



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Mul-8 contains a high percentage of Crystalline Mullite. Crystalline content has long been recognized as a controlling factor in the performance of mullite refractories.

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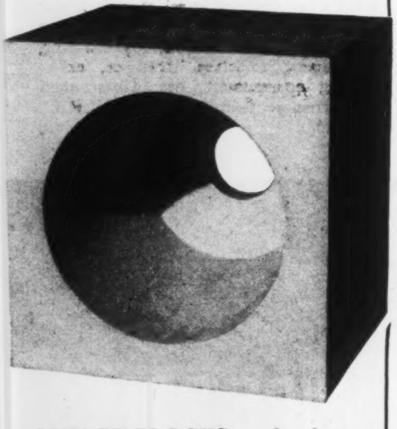

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Behind the Scenes . . .

Henry J.

As an entrant in the Kaiser automobile-naming contest who thought he had submitted a better appellation than the prize-winning *Henry J.*, we believed an explanation was due. So we went to get an exclusive interview with Henry J. himself. We got it—not with Henry J. Kaiser but with Henry J. Holtz, assistant editor of STEEL.

We found our man, a tall lanky chap, browsing through a stack of technical books four feet high on his desk. Among his editorial tasks is book reviewing.

"How do you like *Henry J.* as the name for the new Kaiser?" we asked.

"Lousy. I submitted *Cloudliner* myself." He snapped his book shut for emphasis. "I don't even much care for Henry J. as my own name. I prefer 'Hank' or 'Jack'."

Hank, incidentally, is the proprietor of an expanded feature in STEEL. It's the "Letters to the Editors" section. When you feel like sounding off—not on the Kaiser auto name, please, but on any pertinent metalworking subject — send your epistle along to Hank.

We Concur

In perusing the *EREPA Monthly Booster*, we came across this comment by a gentleman called The Peeper:

When a plumber makes a mistake, he charges twice for it.

When a doctor makes a mistake, he buries it.

But when an editor makes a mistake—wow!

The Clear Crystal Ball

Geraldine, a cleaning woman in the building, our night editor and a demon on statistics, arrived early the other evening before we had left.

"Mistah Shrdlu," she said, "I've been tryin' to see you for the past fo' nights. You been sneakin' out early?"

"Now, Geraldine . . . . ."

"I have a story for you," she interrupted, pulling out the top drawer in our filing cabinet.

By golly, she did, too.

The American Iron & Steel Institute's 1949 final figures on total steel mill shipments and the automotive industry's take of finished steel show that STEEL's estimates of these in its Metalworking Yearbook issue, Jan. 2, 1950, p. 129, were correct within one-half of 1 per cent.

STEEL had the benefit of only 8 months' shipments as a basis to estimate that the automotive industry got 11,015,585 tons and total shipments hit 57,844,281 tons in 1949. Actually, automotive got 10,962,894 tons and 58,104,010 tons were shipped to all consumers last year.

Going, Going

Going, going—but not gone. That's the status of the reprint situation for John Morgan's depreciation study that ran May 8, pages 53-56. If you want copies, write Readers' Service Department, STEEL, Penton Bldg., Cleveland 13, 0.

H. C. McDaniel, manager of Westinghouse Electric Corp.'s technical press service, says: "The depreciation job is a superb start" to draw attention to a situation where "reform is long past due."

Puzzle Corner

The May 8 puzzle about the boys who earned money on their vacation brought as many answers as there are members of STEEL's editorial staff (27). Carl Schafer, one of the men in the Press Division that helps get this book out, was the first one to come up with the right answer—Jimmy made $26, Billy $35 and Charlie $37. But Mr. Schafer had a look before this page went to press.

Among regular readers to turn in correct answers, these are the first: J. R. Defazio of Banks Moreland Co., W. S. Van Bergen of Tuthill Spring Co., Herman Balsam of Titon Tool Works, Mary E. Wholey of the Newburgh & South Shore Railway, Ralph Pappenheimer of Specialty Device Co. and R. R. Rychener of National Gypsum Co.

Here's the puzzle budget for this week: A ball 3 feet in diameter rests in the corner of a room. How high must the ceiling be if a second ball will just touch the little ball, the floor, the two walls and the ceiling at the same time?

Shrdlu

(Editorial Index—page 37)

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STEEL

The Magazine of Metalworking and Metalproducing

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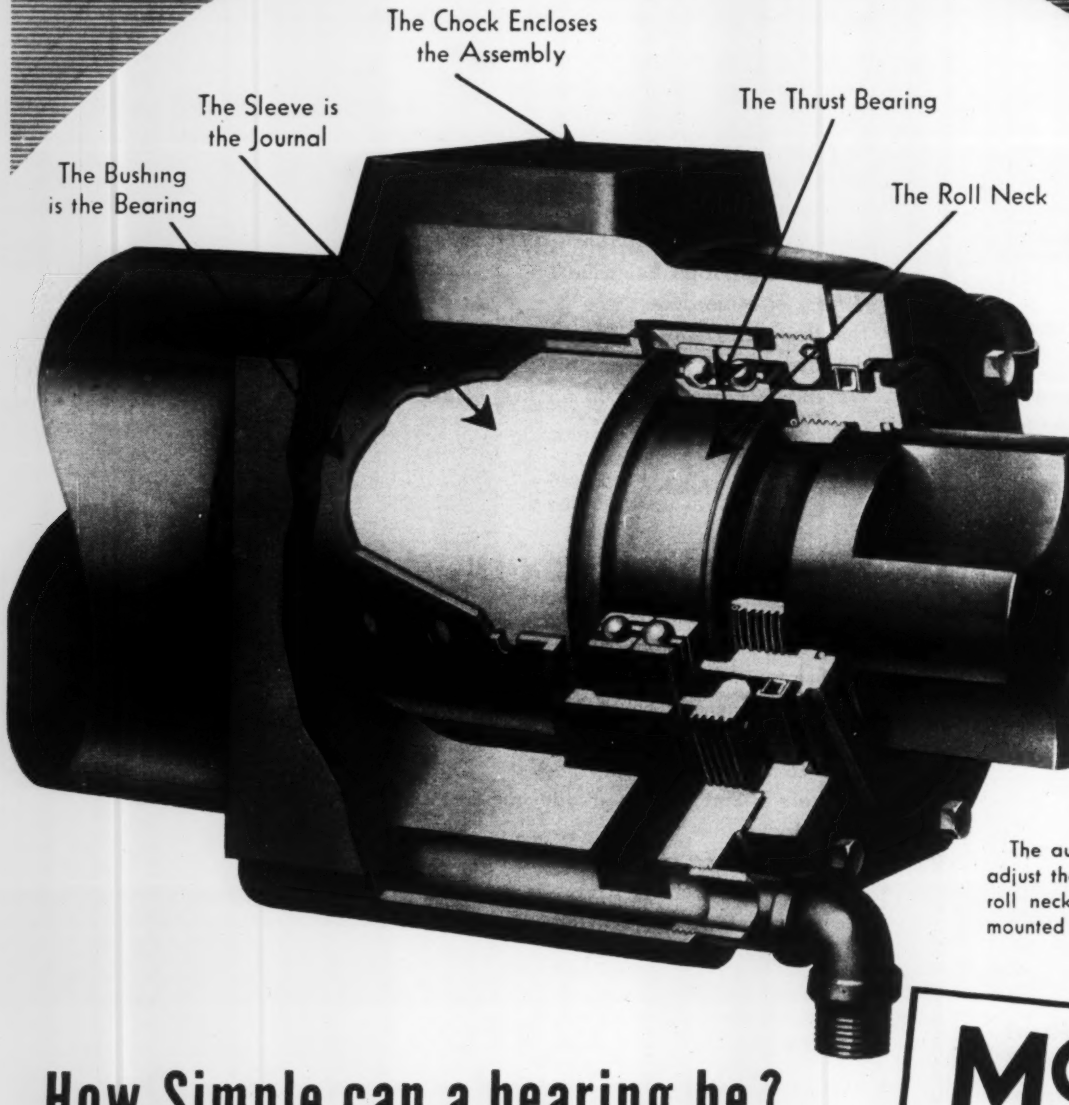
Next Week **.. Use the Right Machining and Drawing Fluids ... New Aluminum Extrusion Process May Simplify Aircraft Construction ... Coke Oven Refractories Reduce Overhead Costs—I ... Production of Malleable Castings—II**

MORGOIL ROLL NECK BEARINGS


The Chock Encloses the Assembly
The Sleeve is the Journal
The Thrust Bearing
The Bushing is the Bearing
The Roll Neck

The auxiliary parts serve to seal and adjust the bearing and secure it to the roll neck—from which it is easily dismounted as a unit.

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AS THE EDITOR VIEWS THE NEWS

May 22, 1950

What's the Score?

There is a growing disposition in Washington to hint that the American public is too apathetic toward the cold war. Some able men in public office are saying that if the people were thoroughly aware of its implications, they would be more willing to sacrifice a few peacetime prerogatives for the sake of national security. Apparently they think the cold war is serious enough to warrant imposition of certain controls and restraints which heretofore have been invoked only in time of a shooting war.

This point of view is reflected in the request by Chairman Johnson of the Interstate Commerce Commission for a freight car building program to provide for any future military emergency. He suggests Class 1 roads add enough freight cars to permit them to handle 5 per cent more traffic than they carried in the peak war year of 1944. He thinks the roads should add 85,000 new cars in 1950 and 160,000 a year in 1951 and 1952.

Obviously the railroads see no immediate need for this number of cars. If this program were to go through, the government would have to arrange for financing those in excess of the normal purchases by the railroads. Also the program might require allocations of steel. Even more important is the fact that if building these cars is necessary for reasons of national security, then there are scores of other projects which should be undertaken to make the nation secure. A balanced program of preparedness certainly would entail allocation of materials, curtailment of unimportant production and numerous other drastic measures.

Are these extreme precautions necessary or advisable or are they just another trick of the government to create a new crisis as an excuse for seeking more authority and spending more money? The question is important because if the cold war actually warrants wartime measures, then the President and Congress should quit spending time and money on unessentials. If the freight cars are actually needed now, then President Truman had no business making pollyannish speeches on his recent "non-political" tour.

Either this scare technique is based upon sound judgment or it is a fake. It is up to somebody in authority in Washington to tell the people the score.

* * *

APPROACH IMPRACTICAL: France has made a dramatic gesture toward economic unity in Europe. The Bidault cabinet proposes that France and West Germany place their coal and steel production under the control of a joint high authority. Other European countries, including Russia and her satellites, could do likewise. The sponsors believe that such pooling of iron and steel output "will insure immediate establishment of common bases of economic development and the first stage in European federation."

Almost everybody agrees that economic coordination in Europe would be a wonderful thing, but many will doubt whether the French proposal is a practical approach to this laudable objective. The pooling of production and attendant details of the proposal have many of the earmarks of cartelization or of a modified NRA for Europe. In general concept, the plan is socialistic.

What Europe really needs is a marked expansion in the consumption of coal and steel. Control, regimentation or allocation of production

(OVER)

will not increase consumption. The outstanding example of how Europe could solve her economic problem is furnished by the United States where private enterprise, spurred on by free competition, has produced more goods at less cost for more consumers.

This successful formula could be applied in Europe, but the approach is not cartelization. Instead it is the vigorous influence of competition, which promotes efficiency, reduces prices and increases consumption. Is Europe's political bias for socialism so firmly entrenched that she cannot avail herself of the obvious formula of competitive enterprise for her economic salvation? —p.56

* * *

PROGRESS BY ACCIDENT: In 1826 when Seth Boyden tried to make European malleable iron in his small foundry in Newark, N. J., he was disappointed because his annealed castings displayed a dark gray or black fracture instead of the "white heart" he had expected. Later his chagrin was relieved by discovery that his "black heart" malleable possessed greater toughness and ductility than the European "white heart." Unwittingly he had produced a new material—American malleable iron.

Today more than a half-million tons of malleable castings are used annually in the automobile industry for differential cases, housings, brackets, supports and other parts. They are used for many agricultural implement parts and for countless applications in farm, road and construction machinery, railroad rolling stock, electrical transmission equipment and many other fields. The interesting story of American malleable cast iron begins in this issue in Part I of an article on Production of Malleable Castings by James H. Lansing, technical and research director, Malleable Founders' Society. —p. 86

* * *

THE RIGHT TO BE RIGHT: Speaking at the Boston Jubilee of 1950, President Benjamin F. Fairless of United States Steel issued a forceful protest against persecution of business by the federal government. He declared that we have on our statute books such a hodgepodge of so-called anti-trust laws that "the only way a businessman can be sure of obeying them all is just to go broke."

For instance, if several strong competitors quote the same price, they are suspected of violating the Sherman Anti-Trust Law. If one cuts his price, he can be in trouble under the Robinson-Patman Act. If one raises his price and the others do not, he goes out of business. Mr. Fairless concluded his address with an appeal to the people to win from Congress "the one remaining right that today is unjustly denied to every businessman in America. That is the right to be right."

How good it is to see spokesmen of business again taking the offensive! —p. 47

* * *

CHALK UP NEW RECORDS: Fortunately the short-lived railroad strike ended just in time to prevent the spoiling of some unusual production records. A few more days of idleness on the struck roads would have played havoc with some industrial operations.

With Chrysler snapping back into production with incredible speed, the automobile industry assembled 177,398 cars in the week ending May 13. This is an all-time record. Steelworks last week were operating at 101 per cent of their weekly capacity of 1,906,268 net tons. This publication's index of industrial production for the same week stood at 204 per cent of the 1936-1939 average. This also is a new record.

Even allowing for the factors of inflation and efforts to make up for losses incurred through strikes, this rate of industrial activity is impressive. —pp. 59, 63, 127

* * *

GREATER SALES EFFORT: At the fortieth spring meeting of the National Association of Sheet Metal Distributors in Pittsburgh R. K. Follansbee, vice president of Follansbee Steel Corp., made a timely suggestion that distributors might well exert more sales effort on certain products. In discussing the terne plate situation, he said that in the last few years "we've lost a lot of business to nonmetallic roofing materials manufacturers. Part of that loss resulted from circumstances over which we had no control. But I'm sure that another part of it we lost because we weren't fighting hard enough for it. We had a lot of business in other lines and not enough materials to go around, so we didn't do as good a job as we should have."

This situation has prevailed in many lines other than terne plate. There is room for improvement in selling all along the line in metalworking industries. —p. 49

E. L. Shaner

EDITOR-IN-CHIEF

News Summary

IT NEVER RAINS BUT IT POURS—Freight car builders heard a lot of good news last week that could mean bad news to other steel users not engaged in car building (p. 45). Pennsylvania Railroad's order for 10,000 cars, the largest placement in 25 years, will give another turn of the screw to the already tight steel supply situation. The six builders working on the 10,000-car job—to be financed under an insurance company leasing plan—can't deliver until early 1951 because of the steel scarcity. All steel users will scratch for the metal as they have rarely had to before if ICC Chairman J. Monroe Johnson's proposed freight car building program is implemented. He thinks 160,000 new cars should be built in both 1951 and 1952. Car builders would need 2.5 million tons of steel yearly for such a program, nearly twice what it will use in 1950.

HOW GOOD IS GOOD?—Metalworking production records continue to fall (pp. 62-65), despite the firemen's railroad strike that ended May 16. Steelmaking operations last week soared to 101 per cent of capacity, a new peak. STEEL's industrial production index is up to 204, another alltime high. Auto assemblies for the week ended May 13 hit 177,398, the third record to fall. Jobbers received 3,030,480 tons of steel in the first quarter, still another peak. Nudging industrial activity still higher will be increased federal spending.

HEAT IS ON—Industrial furnace people are happy, too, about business prospects (p. 48). First quarter sales of $6.4 million were 40 per cent ahead of the same period last year and were the largest for any like period since 1947.

FOREIGN COMPETITION—Look for increasing competition from European builders for overseas machine tool markets (p. 57). Just back from a tour of Europe is Jerome Raterman, president of Monarch Machine Tool Co., who says that both quality and quantity of European machine tool production is improving.

UNION, BUT NOT NOW—Don't expect speedy action on the proposal that the French and Germans place their coal and steel production under a joint high authority which other European nations can join (p. 56). Even if the French plan had unqualified support everywhere, it would take a long time to work out details. Varying price levels, to name just one difficulty, would have to be equalized. But the proposal doesn't have complete support. A test ballot in a French National Assembly committee approved the government's stand by only one vote.

DOUBLE PLAY—A drive to curb air and water pollution is getting impetus from government action (p. 49). A federally sponsored meeting on air pollution reveals that industry and government are spending about $100 million a year to curtail smog. A newly organized U. S. committee, the National Technical Task Committee on Industrial Wastes, recommends that Congress enact a bill giving tax incentives to companies building waste water treatment plants.

SLAP ON THE WRITS—Your case pending before the FTC may not take years to settle (p. 52). In an unprecedented warning, the FTC has told top lawyers on its staff that "results would determine how permanent the appointments would be." The commission says it won't tolerate long legal delays any more.

HERE AND THERE IN INDUSTRY—Oil prospecting in the sea can be made practical by a floating platform (p. 51) . . . Sheet metal distributors expect a well sustained demand for the rest of the year (p. 49) . . . New England Steel Development Corp., with Clifford S. Strike as president, has been organized to handle business arrangements "essential to the development of a regional steel mill" (p. 48) . . . Fairbanks, Morse & Co. and Canadian Fairbanks-Morse Co. have bought an interest in Canadian Locomotive Co. and will enter the Canadian diesel manufacturing field (p. 50) . . . U. S. Steel Corp. President Ben Fairless is plugging for the right to be right; he says that industry in obeying one law unwittingly breaks others (p. 47).

Production-Engineering News—p. 73 *Market Summary*—p. 127

For Safe Footing
Inland 4-Way Safety Plate

RYERSON STEELS
For Quick Shipment . . . Call Ryerson

The lugs you see on these pieces of Inland 4-Way Safety Plate provide safe, sure traction in all directions. Hot rolled at right angles to each other, the 4-Way projections also form an attractive pattern—clean and open to drain and sweep.

This rugged safety plate is available for quick delivery in two pattern sizes and a wide range of thicknesses at your nearby Ryerson plant. And, you can order it sheared, flame-cut, bent or punched to your exact specifications.

Inland 4-Way Safety Plate is firesafe, non-absorptive, long-lasting. It's easy to weld and fabricate; inexpensive to install because the 4-Way pattern matches whether laid side to side or side to end.

For any amount of safe, money-saving Inland 4-Way Safety Plate, call your nearby Ryerson Plant—and get immediate shipment from our large and complete stocks.

Also in Stock: Carbon, Alloy & Stainless Steels in Bars, Structurals, Plates, Sheets, Tubing, etc.

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JOSEPH T. RYERSON & SON, INC. PLANTS AT: NEW YORK • BOSTON
PHILADELPHIA • DETROIT • CINCINNATI • CLEVELAND • PITTSBURGH • BUFFALO
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STEEL
A PENTON PUBLICATION

Steel Buying Problems Ahead?

ICC Chairman Johnson proposes mammoth freight car building program that could force revival of allocations because steel supplies are already tight

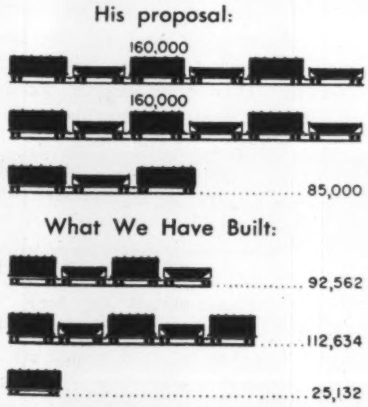
GETTING enough steel? It will be more difficult than ever to obtain if a big freight car building program proposed by Chairman J. Monroe Johnson of the Interstate Commerce Commission materializes.

Colonel Johnson told a Senate commerce subcommittee investigating surface transportation that Class I roads—those with annual revenues of $1 million or more—should add freight cars to provide for any future military emergency. He thinks the roads should be able to handle 5 per cent more traffic than they carried in 1944, the peak year of World War II.

Nearly 2 Million Cars—For 1951 and 1952, Colonel Johnson proposes the most ambitious car building program (see the chart) since 1923 when 175,748 cars were delivered. The program would jolt the car building industry out of the doldrums, for last month it delivered only 971 cars, the lowest monthly total in more than 11 years.

"Build Freight Cars,"

. . . ICC chairman urges

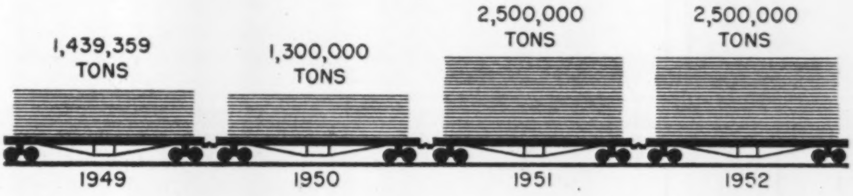


The ICC chairman thinks that when the railroads have a total of 1,920,000 cars, they'll "have enough for the higher wartime level of operation." The roads had 1,764,109 cars on Dec. 31, 1944, and 1,738,593 on Mar. 31, 1950. Normal car retirements over the next two years mean that enough cars would have to be built under the program to offset the retirements and to increase the total.

Allocations Again?—If the car program gets the government's okay, what will it mean to you as a steel consumer? Trouble, probably. An average of about 15 tons of steel goes into each freight car. That would bring the car builders' steel take in 1951 and 1952 to 2.5 million tons yearly (see the chart), nearly double the 1949 consumption. If the program is implemented, a scramble for steel could come that would rival that of the immediate postwar period in severity. It could mean a revival of government allocations. Colonel Johnson admits that his plan "would doubtless require effective measures for channeling steel."

Steel Requirements Would Double

. . . under proposed freight car building program



Of the 1.4 million tons of steel that went to the freight car building industry last year, nearly 80 per cent consisted of just four products—plates, structural shapes, wheels and hot-rolled bars. While none of these products is now difficult to get as sheet or strip, they quickly could become as hard to obtain—especially plates which account for almost 40 per cent of all steel used in cars. Steel producers would have to shift from sheet to plate rolling to turn out anything like the 1 million tons of plate that would be required by builders in both 1951 and 1952 if 160,000 cars a year are produced.

Nothing to It — Colonel Johnson says the production side of the program can be handled by the industry if it gets the steel. He does not say how the financial side can be managed. If the railroads are given better depreciation rates for tax purposes, he says "that would do wonders." He skirts the question of government aid in financing the program.

Nor is the ICC chairman specific about what the railroads will do with surplus cars even if they manage to buy or lease them. He only suggests that perhaps the government can "stockpile" what is not needed.

Pullman's Business Improves

Pullman Inc. has 6000 freight cars on order under the Equitable Life Assurance Society's leasing plan, and the car builder expects additional business under the program, says President Champ Carry. Total orders on the Pullman books for new freight cars approximate 8000.

Mr. Carry says that the company will make a better showing in the second half of the year than in the first.

Pennsy Orders 10,000 Cars

Pennsylvania Railroad has placed orders for 10,000 freight cars to be financed under the new rental program.

It's the largest single order placed with outside car builders in more than 25 years and will do wonders to revive the falling freight car order backlog that on May 1 had sunk to 27,950.

Pennsylvania will obtain use of the cars under a lease arrangement involving future payments in excess of $50 million for a period of 15 years. Although Pennsylvania didn't reveal who will handle the financing, Equitable Life Assurance Society will probably lease the cars under a plan similar to that used in an agreement with the Atlantic Coast Line. Equitable also has held talks with the New York Central and other roads about leasing deals.

The Pennsylvania orders call for

5000 box cars and 5000 gondolas. This is the likely order breakdown: 3000 gondolas to Pullman-Standard Car Mfg. Co.; 2000 gondolas to Bethlehem Steel Co.; 2000 box cars to Pressed Steel Car Co.; 1500 box cars to American Car & Foundry Co.; 1000 box cars to General American Transportation Corp.; and 500 box cars to Greenville Steel Car Co.

Because car builders expect to have trouble getting steel, delivery won't take place until early 1951.

Car Spurt Aids Door Firm

The pickup in freight car orders has brought a sharp rise in business for Youngstown Steel Door Co., Cleveland. Orders received by the company so far this year are running at about double the rate for 1949.

Youngstown expects to get a good share of the door business for the Pennsylvania freight car order. One factor in the pickup in orders is the tendency of railroads to build more cars in their own shops. As a result, Youngstown benefits through increased orders for car sides as well as for doors.

Good Backlog for Greenville

Greenville Steel Car Co. now has enough orders—including a new one for 500 box cars for the Pennsylvania Railroad—to carry it into October.

The company, a subsidiary of Pittsburgh Forgings Co., closed its plant at Greenville, Pa., last November for lack of orders but resumed operations in April on a rebuilding contract.

Cost-Cutting Tip

In looking for places to cut costs don't overlook what product rejections may be costing you.

Product rejections resulting from higher standards demanded by purchasers are costing industry about $3 billion annually, Joseph Manuele, director of Westinghouse Electric Corp.'s Headquarters Quality Control department, pointed out at the American Standards Association's semiannual company member conference in Pittsburgh last week.

Elimination of these rejection costs would save the American public every year more than it is spending for all electrical household appliances, including radio and television receivers.

U.S. Moving in on Railroads

The government may take over many of the nation's railroads by moving in through the caboose, charges Robert W. Marshall, director of the traffic department for E. I. du Pont de Nemours & Co.

He attacks the government's action in filing a series of rate reparation cases against a number of railroads. These cases are now pending; many involve shipments of government material during the war.

"The amount sought by the government in these proceedings," he says, "is in excess of $2 billion. That amount is about twice as much as the total operating revenues the Class I railroads have left each year after deducting operating expenses and taxes. If the Department of Justice lawyers are successful, it is quite probable the only way the government could collect would be to levy on the railroad properties. That probably would mean that the government would own or control many of the railroads."

Machinery Takes More Steel

Strengthened demand for industrial equipment is reflected in finished steel shipments from mills.

Operating at levels higher than any since a year ago, producers of machinery, industrial equipment and tools received more finished steel in March than in any month since April, 1949. Their take in March, the American Iron & Steel Institute reports, was 278,343 net tons, or 5 per cent of all mill shipments of 5,723,340 tons of finished steel.

Machinery producers' operations in March were at 243 per cent of the 1935-1939 average, according to the Federal Reserve Board. This was the highest level since the corresponding month of 1949 when the index was 252.

The automotive industry continued in March to set new records for purchase of finished steel. It took 1,207,946 tons, or 21.5 per cent of all finished steel shipments from mills.

Also at record levels were shipments to makers of contractors' products. They received 251,957 tons of finished steel from mills. Contractors' products consist of goods going to construction, such as plumbing, hardware, ventilation and culverts.

Finished steel shipments of 182,420 tons to makers of household appliances were much larger than in recent months and seldom have been exceeded, the institute says.

Total mill shipments of finished steel in March were the largest since the 6,305,681 tons shipped in the corresponding month of last year.

Ground Broken for J & L Plant

Ground was broken late last week for Jones & Laughlin's new open-hearth plant in Pittsburgh. Mayor David L. Lawrence turned the first shovel-ful of dirt for the excavation for the huge new plant.

It will consist of six 250-ton stationary furnaces and all the necessary corollary facilities. The building housing the open-hearth furnaces will be 880 feet long exclusive of the mixer building on the down-river end. Provision has been made for future addition of five more similar open-hearth furnaces on the up-river end.

The new shop will have annual capacity of 1 million tons. It will permit abandonment of high cost obsolete No. 1 open-hearth shop which consists of four small stationary furnaces and the Soho shop which consists of six 65-ton furnaces. Furnaces will be in operation in the fall of 1951. The new plant should be in full operation early in 1952.

Welcome Booklet

Thinking of getting out a "welcome booklet" for visitors?

If you are, you might want to look over the one that Belle City Malleable Iron Co. and Racine Steel Castings Co. puts out.

Besides containing the usual information about what the company makes and does and who its officers are, the handy little eight-page brochure tells about: Telephone service, washrooms, cafeteria, transportation information. It contains a small map of Racine which shows important metalworking firms in the city. On the back cover of the booklet is a map of the country between Chicago and Milwaukee, showing the major industrial cities.

Merchant Stack Closed Down

The lone merchant foundry iron stack in the Pittsburgh district—operated by Pittsburgh Coke & Chemical Co. at Neville Island—is closed down for a complete relining. It is the first time since 1942 that furnace hearth and bosh are being relined and since 1946 above the mantel. About 2 million tons of iron have been produced since the last complete relining. The furnace will be relined with carbon blocks machined and keyed in. The company plans to install a new gas washer and a skip hoist. The entire rebuilding program will be finished late in June.

Construction of carbon hearths has been under consideration for some time. The carbon lining is being supplied by Great Lakes Carbon Corp., Niagara Falls, N. Y.

Conversion Market Considered

Knoxville Iron Co., Knoxville, Tenn., is considering re-entering the conversion ingot market as a producer. The company operates two electric furnaces and maintains sales offices in Chicago.

Eager Beavers Roll Off Lines

First production models of the Eager Beaver, a new 2½-ton truck developed for U. S. Army Ordnance, rolled off Reo Motors Inc. assembly lines early last week.

Joseph S. Sherer Jr., president of the company, made the announcement. He says the trucks are part of a $30 million order placed some time ago for about 5000 Eager Beavers that Reo is to deliver to Army Ordnance in the next six months.

He reported a marked improvement in his company's domestic truck sales outlook.

He also told stockholders of a continued rise for Reo's lawn mower division which he described as the world's largest producer of power lawn mowers.

The Right To Be Right

U. S. Steel's president says: "Revamp laws so obedience to one is not violation of another"

WHAT WE NEED in this country is the right to be right!

With that catchy phrase Benjamin F. Fairless, president, United States Steel Corp., pointed up his diagnosis of the dilemma of American businessmen. He was speaking in Boston —"the cradle of our precious liberties"—at the Boston Jubilee of 1950.

Significant is not so much what he said but that he said it. It shows in this instance at least that industry and private enterprise are taking the offensive against government oppression, not sitting back and letting government have all the advantage of the initiative.

Trapped—When every businessman in America can be found guilty of violating the law, there is something wrong with the law and not the businessman, Mr. Fairless observed. "If our businessman obeys the Sherman law he is probably violating the Robinson-Patman Act, and if he obeys the Robinson-Patman Act he is almost sure to be violating the Sherman Antitrust law," Mr. Fairless declared. "When the Supreme Court of the United States outlawed basing point selling methods in the Cement Case, the heads of more than 100,000 American businesses—men who had been conducting their affairs in a perfectly law-abiding manner—were suddenly confronted by the possibility of being classed as criminals," he asserted.

You Can't Win—It's almost impossible to stay out of such a predicament, Mr. Fairless explained. To a practical businessman, competition is a very simple thing, he noted. It exists when two or more companies are trying to sell similar products to the same customer. If each product is of the same quality, if each competitor provides the same service, and if both enjoy equally good reputations for dependability and integrity, "it is," he said, "perfectly obvious that both are going to have to offer their wares at the same price to keep in the running.

Round and Round—"But if both quote the same price, that fact alone is construed to be evidence of collusion and a violation of the Sherman Antitrust law. So our businessman cuts his price, tries to undersell his competitor . . . and is in real trouble under the Robinson-Patman Act. If he raises his price, and his competitors don't, he goes out of business. If his competitors do follow his lead and raise their prices too, he can stay in business, but he's right back where he started so far as the antitrust laws are concerned, and in addition to that he is almost certain to get an 'invitation' or a subpoena from Senator O'Mahoney and Congressman Celler.

"The unhappy fact is that once a man goes into business, anything he does is wrong," Mr. Fairless lamented.

He called on his listeners "to dedicate ourselves here and now to the task of winning from our Congress the one remaining right that today is unjustly denied to every businessman in America and to every man in America who may wish to go into business.

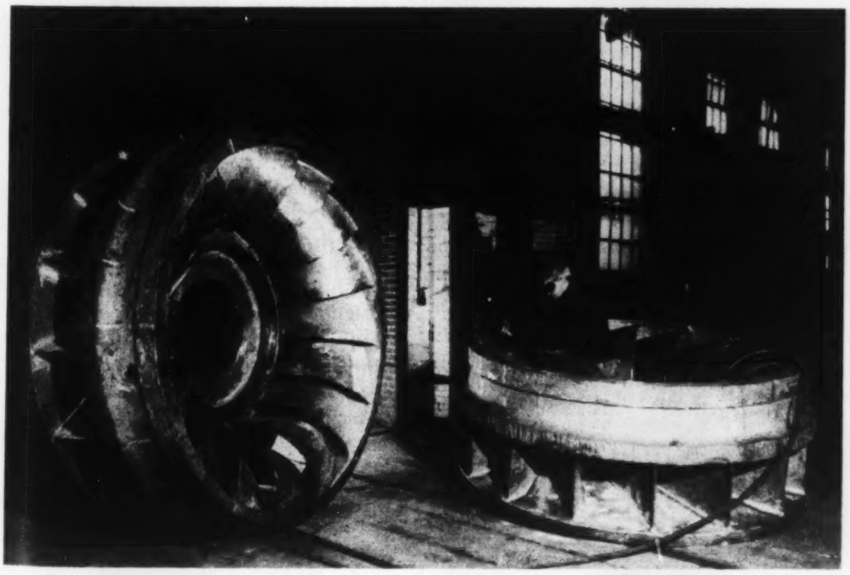
"That is the right to be right!"

Big Business: He's for It

Another vocal defender of business is Robert S. Waters, president, National Radiator Co., Johnstown, Pa. He went as a small businessman to Washington to speak up in favor of both the present practices and continued existence of big business.

Appearing before the House Judiciary Subcommittee on the Study of Monopoly Power, Mr. Waters made it clear that his company, which is supplier and customer as well as competitor of many larger companies has been helped, not hindered, by their existence and the ethics of their operations.

"All big business is not bad, any more than all small business is good," he declared.



STAINLESS STEEL RUNNERS: Weighing 16,000 pounds apiece and measuring 8 feet in diameter and 3 feet in height, these stainless steel runners were made at the Bethlehem, Pa., plant of Bethlehem Steel Co. They are for a South American hydroelectric installation. Steel for the runners was produced in a 50-ton electric arc furnace

Industrial Furnace Business Warming Up

First quarter sales of $6.4 million were 40 per cent ahead of last year. And the outlook for the rest of the year is rosy, IFMA told at annual meeting

INDUSTRIAL FURNACE business is better and it will be good the rest of the year.

That's the pleasant report the Industrial Furnace Manufacturers Association got at its annual meeting last week at Hot Springs, Va., from its newly elected president, Henry M. Heyn, sales manager, heat treat division, Surface Combustion Corp., Toledo, O.

First quarter sales of $6.4 million were 40 per cent ahead of last year and were the largest for any like period since 1947. Sales in the first quarter of last year were $4.5 million and in fourth quarter, $2.6 million. First quarter furnace sales to the steel industry also were up substantially.

Rosy Outlook—Mr. Heyn expects business to be excellent for at least the rest of 1950 with volume for the year about 15 per cent ahead of 1949. The downtrend in unfilled orders experienced in 1949 has been reversed, the total now being the highest in over a year.

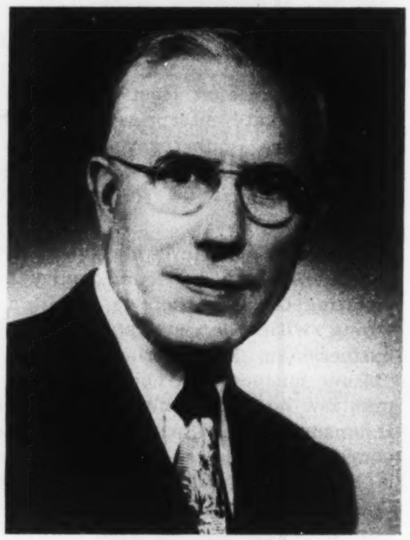
In his presidential address, Mr. Heyn told members that "the most effective means of selling production equipment, such as furnaces, is through continuous research and development so that industry has little choice but to buy on the basis of sound economics."

Mr. Heyn succeeds W. E. Borbonus, president, R-S Products Co., Philadelphia. New directors include: Lee Wilson, Lee Wilson Engineering Co. Inc., Cleveland; Fred S. Bloom, Bloom Engineering Co., Pittsburgh; C. H. Vaughan, the Electric Furnace Co., Salem, O; Harold Koch, Hevi-Duty Electric Co., Milwaukee; and R. L. Harper, Harper Electric Furnace Corp., Niagara Falls, N. Y.

Wanted: Tax Revision—Mr. Borbonus declares that small business has more to fear from government than from big business. One of the first real helps to small companies, he said, would be revision of tax laws to permit rapid amortization of investments on capital equipment.

He cited the case of a small company needing a $30,000 machine tool. Because of high taxes, it cannot retain enough surplus cash and must borrow from a bank. The bank is willing to finance the transaction for a maximum of only three years. But, the machine cannot be depreciated in less than 20 years so the company must gamble on the 17-year differential.

The group will hold its mid-winter meeting at the Edgewater Beach Hotel, Chicago, Jan. 15-16, and its annual meeting at Hot Springs, May 7-9, 1951.



HENRY M. HEYN
. . . new IFMA president

Testing Society To Hold Show

New testing and scientific equipment will be on display in Atlantic City, N. J., June 26-30 when the American Society for Testing Materials holds its annual meeting.

Manufacturers and distributors of instruments and laboratory supplies will emphasize the continued progress being made in providing the research and testing engineers with facilities for evaluating properties of all kinds of materials. In addition to the improved types of physical and chemical testing instruments, many of the new types of spectrographs, nondestructive testing instruments and equipment for stress analysis will be featured.

Industrial Suppliers To Meet

Mr. Manufacturer, want to hear what distributors expect of you? Attend the 1950 Industrial Supply Convention in Atlantic City, N. J., May 22, 23 and 24.

If you think distributors also should be told a word or two you'll have your inning.

Among program highlights are a discussion by Joe W. Pitts, president, Brown-Roberts Hardware & Supply Co. Ltd., Alexandria, La., on what distributors expect from a manufacturer. William A. Purtell, president, Holo-Krome Screw Corp., Hartford, Conn., will tell distributors what manufacturers expect from them.

It all will be in good spirit, with the sights set on how to do the best job in distribution of industrial equipment and supplies.

Participating in the convention will be members of the American Supply & Machinery Manufacturers' Association, National Supply & Machinery Distributors' Association, and the Southern Supply & Machinery Distributors' Association.

New England Steel President

The New England Council elected Clifford S. Strike president of New England Steel Development Corp., organized to handle business arrangements "essential to the establishment of a regional steel mill."

Mr. Strike is president of F. H. McGraw & Co., engineering and construction firm of Hartford, Conn.

The New York engineering firm of Coverdale & Colpitts was retained to survey the economic feasibility of locating a steel mill in the New London, Conn., area. Other officers of the new corporation are: C. E. Whitney of Ely, Bartlett, Thompson & Brown, law firm of Boston, who is secretary and Dudley Harmon, executive president of the council, who is treasurer.

Directors of the corporation are: Frederick S. Blackall Jr., president and treasurer, Taft-Peirce Mfg. Co., Woonsocket, R. I.; Dr. Alfred C. Neal, vice president and research director of the Federal Reserve Bank of Boston; John E. Kelly, mining engineer; Richard L. Bowditch, president of C. H. Sprague & Son Co., Boston; and Mr. Strike.

Gairing, CTMA Secretary

Emil Gairing, president of the Cutting Tool Manufacturers Association, announces appointment of Martin Ewald as executive secretary of the association. He succeeds the late Harry Merrick. Mr. Ewald is counsel to National Foundry Association.

Stockpile of Industrial Diamonds

Speaking before the American Society of Tool Engineers of Williamsport, Pa., Harry L. Strauss, Jr., National Diamond Hone & Wheel Co., New York, advocated industry laying away a stockpile of industrial diamond tools of its own. He urged that as an adjunct to the government's stockpiling program.

Says Mr. Strauss, this should take place when and if industry and government would co-operate; industry shouldn't be taxed on dead inventory assembled for national defense.

Good Demand in Sight

Major consuming groups will keep sheet metal distributors pretty busy

SHEET METAL distributors will experience a well sustained demand from major consuming groups the rest of this year.

Their business probably won't get much heavier than it is now but it should remain constant. The reasons it likely won't get much bigger are: 1. The postwar boom is over, and none of our major industries is in a position to provide the economy with another strong stimulus on the up side; 2. inventory levels will be adequate again soon and there will be no drive to buy simultaneously for inventory purposes and current consumption; and 3. overall demand for flat-rolled steel is so strong that distributors could not immediately get sufficient additional tonnage to take care of a large business increase.

Not Bad — This was the picture members of the National Association of Sheet Metal Distributors saw at their spring meeting in Pittsburgh, May 11 and 12. All in all it was an optimistic picture, for even if business moves along sideways it will be good. And a sideways movement, with possibly a slight declining trend, is what is seen by one of the speakers, Bennett S. Chapple Jr., Pittsburgh, assistant vice president, United States Steel Corp. of Delaware. "There appears to be no evidence that the economy faces any serious threats during the rest of the year," he said.

Work Harder — Even if business should tend to ease off, sheet metal distributors might soften the decline by exerting more sales effort. They might, for instance, push metal roofing sales a little harder. R. K. Follansbee, vice president, Follansbee Steel Corp., Pittsburgh, in discussing "The Terne Plate Situation," said: "In the last few years we've lost a lot of business to nonmetallic roofing materials manufacturers. Part of that loss resulted from circumstances over which we had no control. But, I'm sure that another part of it we lost because we weren't fighting hard enough for it. We had a lot of business in other lines and not enough materials to go around, so we didn't do as good a job as we should have."

Clean Air Costs Money

Industry and government spend $100 million a year to curb smog. U. S. holds conference

INDUSTRY and government are spending about $100 million a year to curb air pollution, says Secretary of the Interior Oscar L. Chapman. Interior sponsored the first government-backed conference on air pollution early this month.

Installation of new control equipment, analysis of various industrial process operations and stack sampling for contaminants has cost $10 million in Los Angeles county alone during the past two and a half years, says Secretary Chapman.

Money in the Air?—In many cases there is no tangible gain to companies installing pollution control equipment, says Gordon P. Larson, director of the Los Angeles County Air Pollution Control District. Los Angeles has one of the most comprehensive pollution control programs in the country. L.A., though, has found that some industries can recover valuable by-products. "Sulphur is now being produced in one plant," says Mr. Larson, "at the rate of 50 tons a day from gases which were formerly burned to produce 100 tons of sulphur dioxide in the atmosphere."

All types of equipment used to control smog—bag filters, scrubbers and electric precipitators—were discussed at the panel on equipment at the U. S. conference on air pollution. Besides equipment, panel discussion groups covered instrumentation as a means to detect air contaminants; chemical analysis of air pollutants; air pollution's effect on cancer and respiratory diseases; the relationship of weather to air pollution; and the legal problems facing government in the control of air pollution.

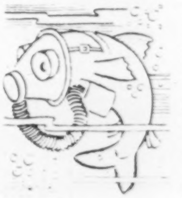
Too Many Laws—Solution to the problem of polluted air depends more on research than on legislation and stringent enforcement, says Richard F. Hansen, of the Legal Advisory Committee, Manufacturing Chemists Association Inc., New York. Let science determine the practical limits of pollution control, he warns, or legislation may demand the impossible.

Water Pollution Fight Intensified

The fight against a second pollution problem—that of water—is being intensified.

Organization of the National Technical Task Committee on Industrial Wastes, was completed at a meeting in Washington, May 9 and 10. Federal Security Administrator Oscar R. Ewing presided.

The Purpose — The committee means "to effect an improvement in quality of the water resources of the nation." Working toward that end with the Public Health Service it will collect data on and develop methods of treating wastes that pollute streams. The new committee will co-ordinate efforts of other working committees that are concerned with elimination of pollution by certain industries.



At the organizational meeting the members agreed that a system of tax relief incentive for constructing waste treatment plants would encourage antipollution efforts. Congress was called upon to enact the Byrnes bill, H. R. 5089, to provide the incentives.

The Committee—Chairman of the new committee is Lyman Cox, waste disposal consultant, E. I. du Pont de Nemours & Co. Inc., Wilmington, Del., and chairman, Water Pollution Abatement Committee, Manufacturing Chemists Association. Committee members from industries of interest to the metals field are: By-product coke, Dr. W. W. Hodge, Mellon Institute of Industrial Research, Pittsburgh; iron and steel, Dr. Richard D. Hoak, Mellon Institute of Industrial Research, Pittsburgh; petroleum, Lee C. Burroughs, Shell Oil Co. and chairman, Waste Disposal Committee, American Petroleum Institute, New York; coal mining, Dr. H. J. Rose, Bituminous Coal Research Inc., Pittsburgh; gas manufacturing, A. Gordon King, American Gas Association, New York; electroplating, Dr. William Blum, National Bureau of Standards, Washington; nonferrous metals, J. C. Dittmer, National Lead Co., New York; electrical equipment, Dr. W. K. Aites, Western Air Brake Co., Wilmerding, Pa.; automotive, H. C. Fluegge, International Harvester Co., Chicago; chemical manufacturing and industry in general as represented by National Association of Manufacturers, Lyman Cox.

Vice chairman of the new committee is Dr. Harry Gehm, National Council for Stream Improvement, Pulp, Paper and Paper Board Industries Inc., New York. Secretary is Louis F. Warrick, chief Technical Service Branch, Division of Water Pollution Control, Public Health Service, Washington.

To Build Canadian Diesels

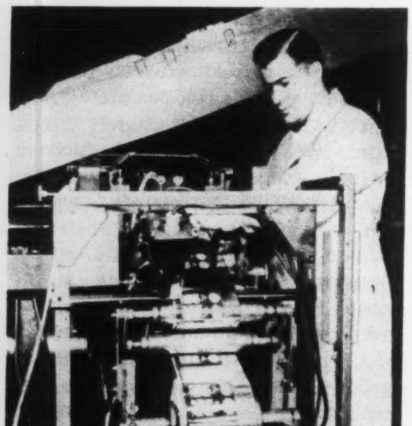
Fairbanks, Morse and Canadian subsidiary are buying stock of Canadian Locomotive Co.

Fairbanks, Morse & Co., Chicago, and Canadian Fairbanks-Morse Co. Ltd. are entering the Canadian railroad diesel locomotive manufacturing field by buying a substantial stock interest in Canadian Locomotive Co., Kingston, Ont.

Canadian Locomotive is the oldest concern of its kind in Canada. It has a capacity of 15 steam locomotives monthly. Directors of the company approved the F-B plan and will submit it to the stockholders at a special meeting, June 5.

F-B officials and engineers will immediately lend all assistance possible to tool up and start manufacturing all types of diesel locomotives. Canadian Locomotive, founded 100 years ago, will be operated as a separate concern; its products will continue under the same name.

Fairbanks, Morse bought 40 acres of land in the greater Kansas City, Mo., area from Atchison, Topeka & Santa Fe Railway Co. and will begin construction of a $5 million plant to make scales. Present scale manufacturing will continue at the St. Johnsbury, Vt., and Moline, Ill., plants.


NEA

ATF IN PACKAGING FIELD: Introducing a machine for the manufacture of collapsible tubes by a new process, ATF Inc., Elizabeth, N. J., is entering the packaging field. The machine produces tubes from foil, laminated or coated on both sides with plastic—a feature that increases the number of substances that can be packaged. Here you see a workman threading a roll of material through the slitting mechanism of the tube machine

Mullins Getting New Department

Mullins Mfg. Corp. will spend more than $1 million on machinery and dies to install a new production department in its Salem, O., plant, says George E. Whitlock, president.

The new department will produce electric dishwashers. Mullins has spent several years in design research and field testing of the new product. It will have it on the market in September of this year.

American Swiss Part of Heller

After half a century of manufacturing in Elizabeth, N. J., American Swiss File & Tool Co. ended that phase of its activity.

The American Swiss company was sold to Heller Brothers Co., Newark, N. J., last year by Frank E. Shurts, president and sole owner, who is now a director of Heller Brothers.

Heller's plant in Newcomerstown, O., and the one in Elizabeth have been among the relatively few in the highly specialized business of making Swiss pattern files. Pending sale of the plant, it will remain as headquarters for American Swiss File and continue in business as a subsidiary of Heller Brothers.

American-Standard's New Lab

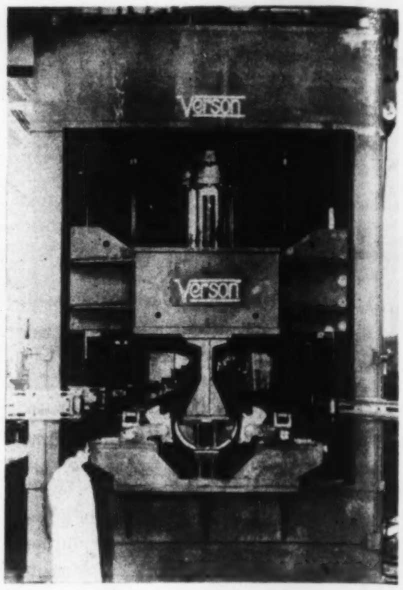
American Radiator & Standard Sanitary Corp., Pittsburgh, acquired a five-story building in Louisville, Ky., for use of the company's research staff.

Until now American-Standard research was carried on in two places, the company's Louisville plant and in a laboratory at Yonkers, N. Y. Activities from both places will be transferred to the new location as soon as a $300,000 alteration job is complete.

Louisville was chosen for the site of the newly combined operations because the plumbing division of the research development was already there and because the company's largest plant is there.

Miles and Miles of Pipe

A study just completed by Gas Appliance Manufacturers Association reveals full details on Federal Power Commission authorizations of major projects involving a cost of $1421.3 million for 22,326 miles of pipe lines.



UNUSUAL TOOL-UP: Forty-foot lengths of 26 to 36-inch line pipe are formed in hydraulic presses by National Tool Co., McKeesport, Pa. Adjustable tooling, developed and manufactured by Verson Allsteel Press Co., Chicago, is used for the first time in forming large diameter pipe. A 2000-ton Verson hydraulic press is used to U-form the steel plates. The same dies are used for all pipe sizes; adjustments are made without removing the tools from the press. In the U-ing operation a forming cycle takes 38 seconds. Closing dies for the second operation consist of a pair of master shoes with different inserts for each pipe size

Those pipe line projects authorized by FPC in the past four and a half years required an estimated 5,337,900 tons of steel pipe ranging in size from 2 to 34 inches outside diameter.

Projects pending authorization of FPC in January of this year, the GAMA survey points out, included 12,700 miles of steel pipe lines that required 2,460,800 tons of steel. Total expenditure of $837,936,000 is required for construction of these projects.

Magnesium Subsidiary to Alcoa

Manufacturing activities of American Magnesium Corp., the magnesium fabricating subsidiary of Aluminum Co. of America (Alcoa), will be assumed by Alcoa effective June 1, 1950. American Magnesium Corp. will become inactive effective that date.

Operations of American Magnesium were conducted in Cleveland and Buffalo and will be continued there under Alcoa management. Other magnesium fabricating activities will be carried on where they have been in the past. Since Alcoa's sales department was sales agent for American Magnesium, there will be no change in selling activities except that Alcoa will invoice all shipments of magnesium products after June 1.

New Rod Mill for Continental

Directors of Continental Steel Co., Kokomo, Ind., authorized construction of a new continuous rolling mill to make wire rods, president R. K. Clifford announces.

The new mill will cost $5 million; it will be built on ground owned by the company. It will take a year to get into operation. Continental's present rod mill will continue to operate until the new one is ready.

Although it is expected that the new unit will replace the old one to a great extent, the old one will be used for special rollings not adaptable to the continuous operations.

Avco To Buy Bendix Stock

Avco Mfg. Corp., New York, contracted to buy 167,500 shares—about 16 per cent—of the outstanding stock of Bendix Home Appliances Inc., South Bend, Ind. It will make Avco the largest single stockholder of Bendix.

The Bendix product line and distribution organization will remain intact and entirely separate from those of the Crosley and American Central divisions of Avco. The two divisions will continue to distribute their lines of home appliances through separate distributor and dealer organizations.

Wabash Building Rolling Stock

Arthur K. Atkinson, president of Wabash Railroad Co., said at the company's annual meeting that the program for improvement and additions to roadway and rolling stock for the year totals $22.3 million.

Of this amount $4.6 million is for roadway and $17.7 for rolling stock. Orders have been placed for 26 diesel-electric locomotives, 20 diesel-electric switch locomotives and four diesel-electric road switch locomotives—all of which are in the process of delivery.

B & O Dieselizing Still More

Through freight service on the Baltimore & Ohio's Buffalo Division will be completely dieselized when additional motive power is delivered next year. B & O placed orders for 34 new 1500-hp diesel-electric locomotive units. It already has 20 diesels in service between Benwood, W. Va., and Riker, Pa.

When the 34 new motive units are added, B & O will be dieselized from Benwood all the way through to Buffalo and Rochester, N. Y., via Pittsburgh, Riker and East Salamanca, N. Y.

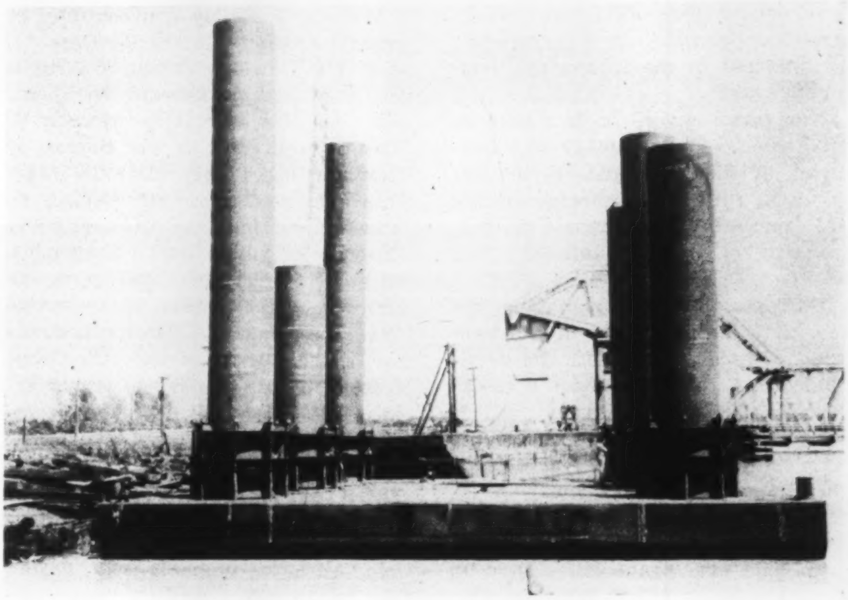
Chemical Equipment Standards

A comimttee to co-ordinate the views of the chemical industry on standards that deal with equipment and products the industry uses in construction, maintenance and operation of its production facilities has been organized.

The committee's studies are expected to include pipe, pipe fittings and flanges, thin-wall tubing, pressure vessels and similar products.

American Standards Association made the announcement. J. G. Henderson, Carbide & Carbon Chemicals Division, Union Carbide & Carbon Corp., South Charleston, W. Va., is chairman. James C. Lawrence, engineering department, E. I. du Pont de Nemours & Co., Wilmington, Del., is vice chairman. C. E. Hilton, American Standards Association, will serve as secretary.

Oil Prospecting a la Jules Verne



TRANSPORTATION SALES' FLOATING PLATFORM

. . . if things don't pan out, you tow it elsewhere

OIL PROSPECTING in the sea can be facilitated by a floating platform that would have been the envy of Jules Verne.

Transportation Sales Corp., Portland, Oreg., showed the way to build and install the platforms for offshore drilling operations: A 60 x 80-foot barge was built of standard steel construction. A number of holes, 6 feet in diameter, were put in the deck so caissons of various lengths could be installed—depending upon the depth of the water at the drilling site.

The caissons are locked in place by air-actuated and air-controlled grippers. The gripping mechanism is divided into two parts with a rubber expansion unit separating them so caissons may be forced upward or downward by air pressure when a portion of the gripping mechanism is released.

Caissons Go Rolling Along—When the caissons are sunk to a firm footing into the sea bed, additional lifting power is exerted by the gripping and lifting mechanism until the barge or platform itself is lifted out of the water to any height required. The lifting rate is about 20 feet per hour.

When the platform is in place and in the air, the drill rig is placed on the deck—and drilling operations begin.

All Aboard—The barge and caissons are manufactured at a shore installation and towed to the drilling site by tug. If things don't pan out and it's necessary to move, the platform may be lowered into the water, the caissons raised and the entire unit towed elsewhere. The structure is of sufficient strength to support more than twice the weight required for a well-drilling operation.

Similar installations are anticipated for permanent docks, sea islands and other requirements where rapidity of installation is of utmost importance. The whole structure is made of steel.

Windows of Washington

By E. C. KREUTZBERG *Washington Editor, STEEL*

FTC is telling its top lawyers to "get on the ball" if they want to hold their jobs. The commission says it won't tolerate delays in the future

LAWYERS holding top posts on the staff of the Federal Trade Commission were warned bluntly that "results would determine how permanent the appointments would be."

The unprecedented warning came after a redistribution of FTC responsibilities. Repetition of delays that have caused past FTC cases to be stretched out over many years won't be tolerated in the future, the commission says.

Now and Forever—In its statement FTC says executive ability and leadership qualifications and the manner in which authority and responsibility are exercised will determine the permanency of any appointment from now on.

Purposes of the reorganization are to: 1. Eliminate delay in the handling of cases; 2. promote the development of the commission's co-operative work with industry; and 3. relate its investigations of complaints with the trial work that may develop therefrom to eliminate waste of effort and cost in litigated matters.

In at the Beginning—The commission staff also has been ordered to associate its economic investigations with actual preparation and trial of cases so "conditions that encourage monopolistic development and practices will be treated in their incipiency."

Convinced that there are many opportunities for obtaining compliance with the antitrust laws without formal legal proceedings, the commission established a new Bureau of Industry Cooperation. It will continue to work with individual industries on codes of fair trade practice. It will have authority to effect settlement of cases, within limits, by voluntary stipulations: Respondents "can settle with the commission by agreeing to discontinue undesirable practices."

Replacements—The old Bureau of Investigation and Bureau of Litigation have been discontinued and replaced by a Bureau of Restraint of Trade and a Bureau of Deceptive Practices. Each will have its own corps of investigators, trial attorneys and other assistants. The former will have all antimonopoly work; the latter will concern itself with false and deceptive advertising and false and misleading business practices.

The Bureau of Industrial Economics will be continued. It will intensify its work of gathering economic information to assist the work of the Bureau of Restraint of Trade and to "determine economic facts in their relation to preservation of the free enterprise system."

William T. Kelley will continue as general counsel. James W. Cassedy, Robert B. Dawkins, Joseph S. Wright, Henry Miller and Edward W. Thomerson are his associates. Joseph E. Sheehy is director of the Bureau of Restraint of Trade; Everette MacIntyre is associate. Dr. Corwin D. Edwards continues as director of the Bureau of Industrial Economics. Richard P. Whiteley will serve as director of the Bureau of Deceptive Practices. James A. Horton is director of the Bureau of Industry Cooperation; P. B. Morehouse is his associate. Everett F. Haycraft is director of trial examiners.

Third Left Fielder on Team

The President's Council of Economic Advisers probably will devote more of its attention in the future to shaping economic reports that will be more palatable to the public and to Congress. In the past the council has spent its time on straight advisory reports to inform and guide the President.

NEA

DR. ROY BLOUGH
. . . influenced New Deal tax policy

Leon H. Keyserling, once acting chairman, is now chairman of the group. John D. Clark is its vice chairman. Third man on the team is Dr. Roy Blough. He was recruited from the University of Chicago where he served as an economics professor. He was at one time director of tax research for the Treasury Department and a major influence in shaping New Deal and Fair Deal tax policies.

Under its reconstituted setup members of the council are encouraged to make speeches and appear before congressional committees to back up administration policies. It was the refusal of Dr. Edwin C. Nourse to go along with such a program that led to his resignation as chairman of the group.

Seaway Project Trickles Away

The St. Lawrence seaway and power bill is shelved for this session unless the Senate acts.

The House Public Works Committee, after hearing proponents of the measure for three weeks, suddenly decided not to devote any more time to it due to pressure of other legislation. Action in the Senate is considered a remote possibility: While a strong bloc wants to act on the bill, Senate leadership hesitates giving it a green light because a lengthy debate is sure to ensue.

Great Lakes Steel Benefits

Great Lakes Steel Corp., Detroit, is the only producer to benefit from the Commodity Credit Corp.'s procurement of ventilating accessories for grain storage structures recently purchased by CCC.

The order to Great Lakes is for 299 steel duct systems for 40 x 100-foot flat steel storage chambers. The intention to buy perforated floors for other storage structures was abandoned when it was found that sufficient additional floors were available in some states to meet requirements in other states.

Because of heavy production in 1949 and large carryovers that have to be stored while room is being made for 1950 grain and other crops that have to be stored on farms, the Agriculture Department decided to make storage-facility loans to farmers available until July 1, 1951. It had been expected that the loans were to be discontinued July 1 of this year. Net result of all this is: An active demand for storage bins and buildings made of galvanized sheets is expected from farmers all this year and next.

The Bells Are Ringing

Fifty-two full-scale replicas of the original Liberty Bell, complete with the crack down the side, will be turned over to the 48 states, Hawaii, Alaska, Puerto Rico and the Virgin Islands by the Treasury Department at the conclusion of the bond drive that began last week.

The Liberty Bell is being used as the symbol of the Independence Savings Bond Drive that ends July 4.

Donors of the Liberty Bells are Anaconda Copper Mining Co., Kennecott Copper Corp., Phelps-Dodge Corp., American Smelting & Refining Co., American Metal Co. Ltd., and Miami Copper Co.

Ford Motor Co. will supply 49 red, white and blue trucks to be used in taking the bells on tours of the states. American Bridge Co. is supplying standards, stays and hardware for mounting the bells on the trucks. Standard Oil Co. of New Jersey will contribute oil and gas for the trucks, and individual truck operators in the states will pay the salaries of the drivers.

The replica Liberty Bells are identical in all respects—size, weight, casting process, legends and markings, and tonal quality—with the original bell which hangs in Independence Hall in Philadelphia. Each bell and mounting will stand 6 feet high.

The bells are about 12 feet in circumference around the lip and 7½ feet around the crown. Each bell weighs about one ton—with mountings, slightly more than two tons.

How Steel Firms Expanded

Special historical value attaches to the printed transcript of the House Small Business Committee's recent hearings on acquisitions, mergers and expansions of 12 major steel companies. In a pocket bound in the booklet is a collection of 12 exhibits on the developments of the companies. The exhibits were prepared by the Commerce Department on the basis of information carefully checked by the companies involved. Copies may be had by writing the committee.

Subcontracts That Are Exempt

The Military Renegotiation Policy & Review Board, Department of Defense, announces that two more types of military subcontracts were exempted from the renegotiation process.

One class includes all subcontracts coming under the Renegotiation Act of 1948 that were entered into on or after Jan. 1, 1949, and are for items customarily purchased for stock in the normal course of the contractor's business. The class does not include subcontracts for the purchase of items especially for use in performing a contract or another subcontract subject to the Renegotiation Act of 1948.

The second class includes contracts and subcontracts, subject to the Renegotiation Act of 1948, for the procurement of supplies from any nonprofit-making agency for the blind at prices set by the Committee on Purchase of Blind-Made Products. The committee was authorized by Congress in 1937; members are appointed by the President.

Plan No. 25 Has Good Chance

Now that W. Stuart Symington is its chairman, the National Security Resources Board is expected shortly again to become more important to manufacturers interested in industrial mobilization planning.

Mr. Symington has been interviewing key officials on the board's staff. When he completes these contacts, he will get away from Washington for a week or so to map out a course of work. Awaiting action are many mobilization studies that have been made in the past. Included are surveys of the production potentials of most key industries in a wartime economy; these show particularly the gaps in capacity which might cause trouble in a war.

Unlike Reorganization Plan No. 12, the President's Reorganization Plan No. 25, which proposes to transfer to Mr. Symington the functions of the board (the other board members would act under him in an advisory capacity), has been well received by Congress and is expected to be allowed to become effective. The move will give Mr. Symington full authority to advise the President as an individual rather than as the agent of the board, and thus prevent delays and confusion which have obstructed action in the past.

T-H Comes Through Unscathed

There were no two ways about it: The Senate's vote of 53 to 30 to kill the President's Reorganization Plan No. 12 was to scotch the assault on one of the main features of the Taft-Hartley Act. Plan No. 12 was not killed on the basis of politics, either: Votes against it came from both sides of the aisle.

When the T-H measure was enacted, one of its main provisions was a separation of the investigative and prosecuting functions of the National Labor Relations Board from its judicial functions. Plan No. 12 would have repudiated this policy by transferring the investigative and prosecuting functions of the general counsel to the NLRB or its chairman. It would have restored the old Wagner Act situation under which the board acted as prosecutor, judge and jury.

The plan came up on the Senate floor with a finding by the Committee on Expenditures in the Executive Departments that the plan was a circumvention of the authority created in the Reorganization Act of 1949 which gave the President power to reorganize federal departments and agencies only in the interest of economy, efficiency and improved management. Plan No. 12 would not result in any economy, but it would cause inefficiency by saddling new duties on a board which already is far behind requirements in its exercise of the judicial function. And the committee didn't find any evidence of inefficiency in the general counsel's department.

The rejection of Plan No. 12 is a resounding defeat for the administration and for the labor leaders who initiated it. It is a notable victory for Senator Taft who led the fight against Plan No. 12. Opinion in Washington is that, no matter what changes the elections bring about this fall, no Congress will repeal the Taft-Hartley Act: Recent public opinion polls reveal that it has growing public support.

Cautious Praise Greets French Union Plan

France proposes that the French and Germans place their coal and steel production under a joint high authority which other European nations can join

EUROPEAN reaction is "wait and see" to the French proposal that France and West Germany place their coal and steel production under the control of a joint high authority which other European nations will be free to join.

Although the proposal was greeted enthusiastically by American and British government officials, other reaction is more mixed. Kurt Schumacher, a leader of the West German Social Democrat party says he "has considerable doubts about the plan." A test vote on the proposal in the Foreign Affairs Committee of the National Assembly approved the government's stand by only 18 to 17. Some Frenchmen think the proposal would be acceptable only if Britain participates and if cartels are excluded. Many Europeans think that Britain eventually will oppose the plan. The British have been cool to every other program for economic union advanced since the war ended.

A Question of Money—One of the most serious objections to the proposal is prices. German prices are about a third lower than France's. That is true only on general domestic prices. Many French export steel quotations are under the Ruhr level.

Major points in the French proposal are:

1. All French and German steel and coal production is to be placed under a joint high authority which other European countries, including those in the East, can join.
2. "The pooling of coal and steel production will insure the immediate establishment of common bases of economic development and the first stage in European federation."
3. The French and German coal and steel production will be offered to all countries on the same terms and will make it possible for Europe to develop the African continent.
4. The high authority will be given the tasks of modernizing production; of making coal and steel available on the same terms on the French and German markets; of developing a joint export policy; and of equalizing the living conditions of the workers in those industries in the two countries.
5. All customs duties on coal and steel between France and West Germany will be abolished and differential railway freight rates will be prohibited.

British Information Services

FRENCH STEEL POOL PLAN

. . . may forestall U. K. nationalization

6. Since conditions of production in France, Germany and other possible participating countries are different, certain "transition measures" must be adopted, including price equating mechanisms.
7. The high authority will be made up of "independent persons designated on a parity basis by the governments." Its decisions must be carried out by the governments.
8. The high authority will have nothing to say about the ownership of industrial properties. It must take into account the powers of the Ruhr Authority and all obligations imposed on Germany "as long as these exist."

What They Produce—Last year Western Germany produced about 10.5 million net tons of steel. France, including the Saar, produced 11.8 million tons. Western Germany is digging coal at the rate of about 100 million tons a year; France-Saar at the rate of about 60 million tons.

If the Benelux countries join France and Germany, there would be a coordination of the industrial heart of Western Europe—the Ruhr, the Saar, Lorraine, northern France, Luxemburg and southern Belgium.

Ruhr Steel Ceiling Would Remain

The French proposal provides that the present ceiling on German steel production—12.1 million net tons—must be maintained for the time being. But once the high authority is created, the security reasons for limiting German production would no longer exist, and the capacity of all participating countries can be determined on economic grounds.

That last provision may be a point that will sell German steelmen on the program. They want the ceiling removed altogether or at least boosted to 15 million to 17 million tons.

Export sales of Ruhr steel companies are improving, although the Germans are undersold on some products. The Germans quote $53 per metric ton on steel bars; the French $48-$49. The ace up the Germans' sleeves is short delivery dates. That factor even enabled them to book orders from U.S. steel firms, particularly for wire rods and other wire products.

About 4.4 million net tons of former German steel capacity has been dismantled by the Allies since the war.

French Prices High

A clue to one reason why the French made their pooling proposal to the Germans is this: France now has the production to export on a larger scale, but her markets are not expanding because of her high prices. A partial economic union with Germany may cut her raw material and production costs.

General industrial production in France is leveling off because of slackening demand. For the first time since the war, some coal mines have had to shut down because of no need for the fuel. The work week in Lorraine iron ore mines has been cut to 40 hours because of the accumulation of stocks.

Benelux Probably Would Join

Benelux is expected to join the economic union if France and West Germany can get togother. Benelux has long been an advocate of economic union; its own arrangement is thus far the only successful set-up in Europe.

Benelux is dependent upon exports to the extent that no other major nation in Europe is, even more than Great Britain. A European federation that would lower tariff walls is to the Benelux advantage.

Belgian steel exports are picking up, partly because prices have been cut. Belgian quotations for export to free markets are now $53.50 per metric ton f.o.b. Antwerp for merchant bars, $52.50 for concrete reinforcing bars, $55 for structural steel, $65 for hot-rolled hoops and $61 for heavy plates and $63 for wire rods. Domestic demand is still dull.

U.K. Steel Studies Proposal

The British steel industry may support Britain's participation in the French pooling plan. The optimum point in British steel exports is approaching and when it does Britons will welcome help. Participation might also forestall nationalization, although the wording in the French proposal carefully skirts the issue of public vs. private ownership.

British steelmen reason that their stand against nationalization will be buttressed if their country joins with France, Benelux and West Germany where the steel industries all have good chances of continuing under private ownership.

Increased rail freight charges went into effect for British industry May 15. The steel companies will absorb the added charges which will cost them $1.40 per ton. Absorption of this added freight charge by steel will cost the industry an estimated $13.7 million a year.

The British government is considering easing the complicated allocations system for steel, because of the great improvement in supplies. Now, a buyer must get permits for any quantity exceeding half a ton. It is expected that freedom will be restored on deliveries for all products except sheets, strip and tubes.

Even the steel industry labor unions favor easing the controls on distribution, so approval by the government of a more liberal program should come soon.

British steel production in April was at an annual rate of 18,840,000 net tons, compared with a rate of 17,756,000 tons in April, 1949.

More Foreign Tools

European machine tool builders boost quality, too. Competition mounts for overseas markets

WESTERN EUROPEAN machine tool builders are stepping up their production and improving their product. In world markets they are providing United States builders with increasing competition, due primarily to lower prices and scarcity of dollars. Some foreigners are even looking to markets in this country, but domestic builders have little to fear on this latter score for some time to come.

These observations were voiced by Jerome Raterman, president, Monarch Machine Tool Co., Sidney, O., on his return from a three-month European tour, in which he visited 11 countries this side of the Iron Curtain.

Prospects Excellent—The machine tool industries in England, Sweden and Belgium are particularly active and have relatively greater backlogs than machine tool builders in this country, he believes. England, he estimates, has stepped up her production to where it is now about half as large as the United States machine tool output. Before the war her production was about one-quarter of the output here.

He also estimates that about 30 per cent of the British production is going to Russia and her satellites. United States builders are not permitted to sell to these countries even if they so desired, although producers in American-occupied Germany are allowed to do so, apparently on the theory that it is to the territory's best interest to build up foreign trade.

Quality and Quantity Up—Mr. Raterman says that West German machine tool builders are overcoming serious handicaps in building up their industry and are now beginning to turn out some fine machines once more. In 1945, he added, about one-half of Germany's machine tool industry was located in the western part and one-half in the eastern part. Since then many producers in Eastern Germany have fled to the western section due to the difficulties encountered in the Russian dominated sector. Actually many plants there have been seized by Russia without compensation.

In Italy a number of machine tool building establishments, although mostly small, have sprung up since the war. Many of the machines produced are copies of American equipment. Italian builders sell most of their machinery in Italy, although they are exporting to southeastern European countries and to South America.

More in the Act—Indicative of the number of machine tool plants that have sprung up in Italy, 34 Italian lathe makers were represented at the Milan fair which Mr. Raterman visited. In the United States there are only 16 lathe builders. In addition to the Italian lathe makers represented at the fair, there were 14 foreign builders of such equipment. The equipment generally was below American standards, in his opinion, and there was little if anything new.

At the Swiss fair only Swiss machinery was displayed and there was little new in the way of mechanical refinements. The Hanover fair in Germany was by far the largest of the three he attended. The standard was generally higher and there were some new refinements. Given time, Western Germany, he believes, will regain Germany's once high position in the machinery field.

Poor Castings—European machine tool builders, in comparison with builders here, are handicapped by inferior castings. That wasn't so true in certain countries—Sweden, for instance—but in general he thinks that is the case.

Regarding his own company, Mr. Raterman says backlogs have increased about 50 per cent since Jan. 1. Demand has been diversified. About 21.5 per cent of his company's business is for export, a good percentage going to the Marshall Plan countries.

European

"MADE IN JAPAN:" These light Japanese trucks are being produced by Nissam Co., near Tokyo. The company produces 450 trucks and 500 small budget family cars per month. Here they are being readied for export to Siam

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THE BULLARD COMPANY

BRIDGEPORT 2, CONNECTICUT

By A. H. ALLEN *Detroit Editor, STEEL*

Mirrors of Motordom

End of the rail strike is a godsend to automakers who narrowly escaped transportation and production tieups. All-time records fall as weekly assemblies top 175,000

DETROIT

MAJOR interruption to auto production schedules was averted by an eyelash last week as strikebound rail lines rushed freight trains back into service.

For the period of the tieup automobile traffic departments were frantically trying to re-route shipments of parts and subassemblies to their networks of assembly plants, and were besieging suppliers for exact information on possible delays in shipments. Some minor layoffs were necessary in outlying General Motors plants, and Chrysler was experiencing difficulty in movement of material normally rail-switched in the Detroit area. Trucks came to the rescue, but if the rail shutdown had continued it would have been a physical impossibility for commercial haulers to have assumed the full load. There are not enough trucks in existence to take on the job, nor do plants have enough truck wells even to begin to handle unloading of the tremendous volume of material required by current assembly rates.

All records for all time have been broken as weekly production has soared past the 175,00 mark. That's equivalent to a monthly total of better than 700,000 which in the early postwar period was little more than a dream. Chrysler snapped back much faster than anyone had hoped, testifying to the ability of its purchasing and follow-up personnel to build up substantial backlogs of all essential materials and parts. The achievement was considered little short of phenomenal, early estimates pointing to about 10,000 cars and trucks in the first post-strike week. Output last week was due for another boost as the corporation accelerated its drive to reach 42,000 weekly.

Chrysler Tools for 1951 Models

Even though assembly schedules are at peak, Chrysler Divisions are losing no time in furthering extensive tooling changes for 1951 models. Briggs is well along with dies for the Plymouth lines since it suffered little interruption to this activity because of the Chrysler strike. Other divisions may be a little behind the Plymouth timetable, suggesting to some sources that the entire Chrysler line will not be unveiled simultaneously as in past years. Much will depend upon the strength shown by retail sales over the next couple of months.

POWERGLIDE GAINS MOMENTUM: W. J. Scott, general manufacturing manager of Chevrolet; T. H. Keating, general manager; and R. L. Dustman, Cleveland plant manager, discuss layout changes that are necessary to double the Powerglide output. Mr. Keating reports production of the new Chevrolet automatic transmission reached about 70,000 units by last week. He thinks increased schedules that the company hopes to achieve by October or November will boost daily output to about 2000 units. Machinery and equipment people think expansion of the Cleveland plant will involve from $8-10 million

Chysler engineers have been busy on new V-8 engines for Chrysler and DeSoto models, although there is conjecture over whether they will be ready for 1951. Equipment suppliers have been quoting on new machinery and tooling for many months on these jobs, with some orders being reported. Much work remains to be done before the power plants will be in production.

Strike Causes Loss for Quarter

Extent of Chrysler's financial loss from the strike was partially reflected in the corporation's first-quarter statement, showing net deficit of $1,782,790 on a sales drop of from $401 million in the first three months of 1949 to about $191 million this year.

Profit last year in the period was $13.7 million on sales of 242,104 vehicles. This year unit sales were only 109,731. Five of the 13 weeks in the second quarter were lost through the strike tieup, so the record as of June 30 will not be too impressive. Some opinion is heard in financial circles that Chrysler, even with the vastly accelerated production plans, has suffered irreparable damage as far as 1950 earnings are concerned, and that years may be required to re-establish the company's position because of the fact that new car buyers who switched to other makes might logically be expected to stay with those models when it comes time for replacement. One thing certain, Chrysler is not going to hold back on expenditures for advertising and promotion in the period just ahead. There is too much at stake. That is another reason for counting on radically restyled models in the next series, with all the engineering innovations at the company's command.

Official denial of plans to work a six-day 54-hour week throughout all plants was made by Chrysler spokesmen last week. They said "relatively few" departments were working overtime and on Saturday, adding that rumors of company-wide plans for such schedules were untrue.

K-F Tries a Shortcut

Use of phenolic casting resin for the production of body die models has been undertaken by Kaiser-Frazer in connection with the new Henry J. It is claimed to cut the time for making dies in half by eliminating the time-consuming process of "carving" mahogany models for mounting on Keller machines which reproduce the die shapes in metal. The method was said to have been developed over the past several years by K-F engineers working in conjunction with Kish Plastics Co.,

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Lansing, Mich. The process was adapted to the production of dies for some large body panels of previous Kaiser and Frazer cars, but the latest project is the first time the system has been used on an entire body.

Under the new arrangement the body first is shaped up in clay, then a plaster mold made of the various body sections, into which the plastic is poured to form the model for the diemaking machines. Suitable allowance naturally is made for shrinkage in the plastic, which is on the order of 0.001-inch per inch.

Croning Process Studied

Another plastic application, currently being given detailed study by several automotive plants is the Croning or "C" process of making molds and cores for metal castings (STEEL, Apr. 10, p. 65, and May 15, p. 51).

Many advantages are seen for automotive foundry applications of the Croning system although it is the feeling that commercial applications must wait further research and analysis. The idea could be the forerunner of a complete revolution in foundry technique or it could be just another of those things that looked good until some death-defying bugs appeared.

Ford Steel Mill Holds Open House

Not too often does a large steel plant hold open house for its families and friends. Such an event was last Thursday, however, at the Ford Rouge plant steel division, where 5300 employees played host to 15,000 visitors.

Under the direction of James E. Sutherland, manager of steel operations, the Ford blast furnace and steel departments have been hanging up new records regularly. In April, for example, blast furnaces tapped 93,766 tons, 12.7 per cent over the January record which called for passing cigars to all hands. The smokes also went around to open-hearth crews who poured 109,326 tons of ingots last month, against a January high of 103,538 tons. On April 28, nine open hearths set a new all-time high record of 4451 tons, topping the previous blue-ribbon day by better than 300 tons.

Guests inspected blast furnace, coke oven and by-product areas, then journeyed through the ten-unit open-hearth building. Displays of safety precautions and equipment, and of quality-control techniques were featured. Local representatives of leading steel producers and Ford plant managers were invited.

Chrysler Adds New Hard-Top

"Renewed" production of the Chrysler hard-top convertible, tentative plans for release of which were made in January, 1946, has been announced. Known as the Town and Country Newport with the "clearbac" window, it was held up four years ago because of materials shortages, but the exceptional popularity of this type of body experienced by General Motors Divisions has rushed Chrysler's plans for similar jobs which will be paralleled by Dodge and De Soto versions in the near future. The Chrysler style carries decorative wood trim over the side body panels.

Hudson Restyles Luggage Section

Two new features provide extra space for businessmen's sample cases of luggage in the current version of Hudson's three-passenger coupe model. A hinged panel behind the rear seat separates the regular trunk luggage compartment from the car interior, allowing ready access to the trunk for loading or unloading from the inside, in addition to access from the outside through the deck lid. The space behind the front seat, plus the trunk compartment area add up to 66 cu ft of usable volume.

Hudson's Earnings Drop

Hudson's net for the first quarter was $2,248,046, equal to $1.18 per share. In the first quarter of 1949 earnings were $1.93 per share.

A model change in February held down production to some degree. April sales figures showed a 50 per cent improvement over the average for the past three months. At the end of April dealer stocks were 33 per cent lower than in April, 1949.

Plant employment was increased by more than 2400 in the past month. It now stands close to 20,000.

Auto, Truck Output

U. S. and Canada

	1950	1949
January	610,211	445,092
February	504,954	443,734
March	609,463	543,711
April	582,000*	569,728
May		508,101
June		523,689
July		604,351
August		678,092
September		657,073
October		601,021
November		474,731
December		384,318
Total		6,533,641

Weekly Estimates

Week Ended	1950	1949
April 29	148,274	136,728
May 6	146,337	130,113
May 13	177,898	118,199
May 20	180,000	116,878

Estimates by Ward's Automotive Reports

* Preliminary.

Buick Sales Soar

Buick retail sales for the first ten days of May continued a red-hot pace, 38 per cent ahead of the best equivalent May period on record (1941) and boosting 1950 deliveries to 200,259, or well over half the 377,115 cars that were sold in all of last year.

Recently installed in the Flint, Mich., plant is an "electric brain" for sorting out daily orders according to any one of the 14,000 possible combinations in model, color, upholstery and accessories. The equipment handles 6000 specification cards hourly, with 60 notations possible on each card.

Die Shops Protest Fussiness

Comment is heard among the independent die shops that tooling work for Fisher body has not been snapped up too avidly because of the extreme fussiness encountered over Fisher inspection.

Die men say that to meet some Fisher demands would run their costs far out of line, and they hint no such extreme limits are practiced in Fisher's own captive die shop. This may all be part of the old system of working out the best balance between the amount of work Fisher body lets out and what it retains. If tools built to extra-precise limits can be bought at the right price on the outside, then that will done, otherwise the jobs will be kept home. You have to make frequent tests of what cooks on the outside to see where you stand on the inside.

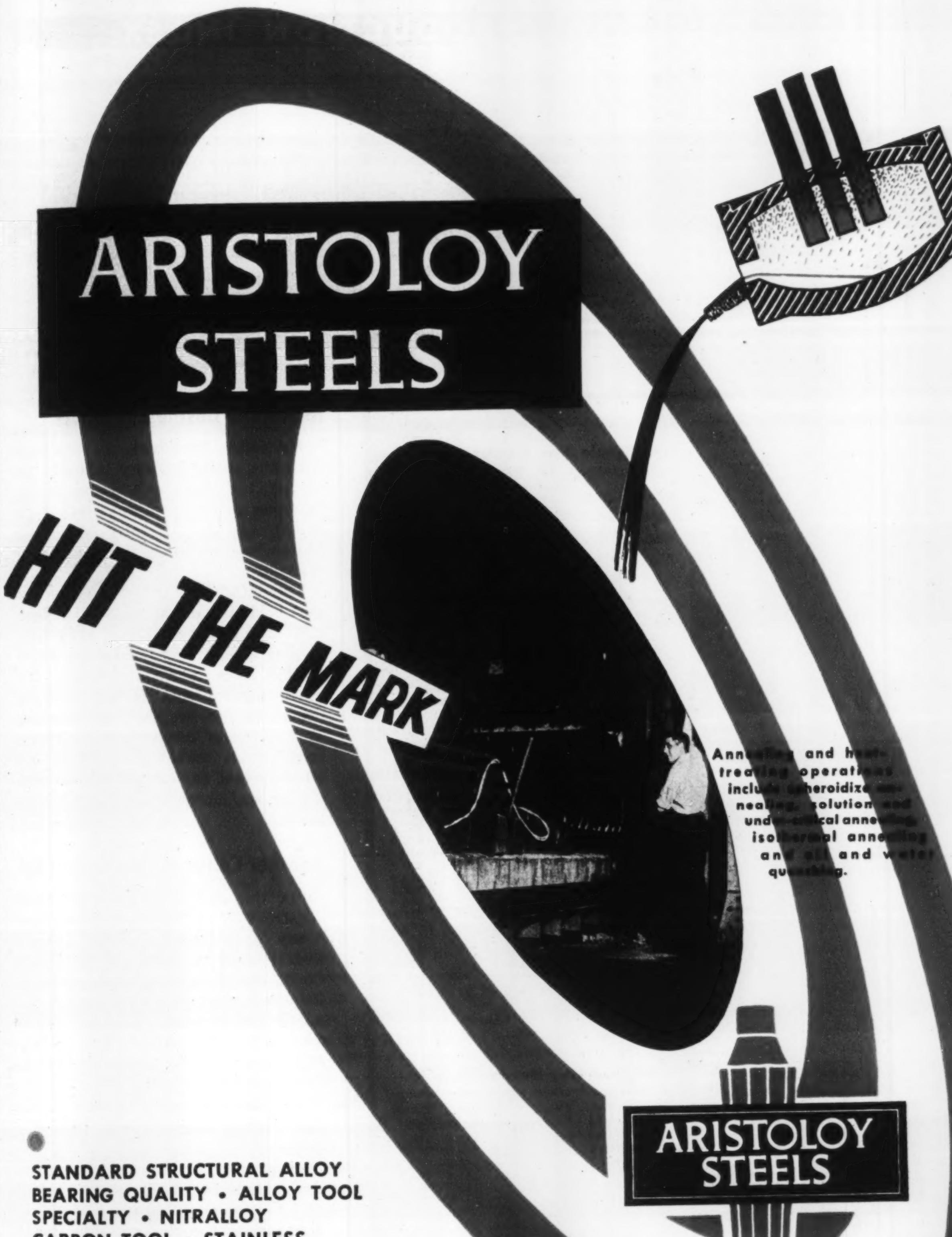
There is nothing particularly new in this approach.

GM Quarterly Earnings Up

Astronomical earnings of General Motors for 1949 climbed still further in the first quarter of the year, exceeding $212 million and equivalent to $4.76 per common share, against $3.04 in the corresponding period a year ago.

Unit sales were up 54 per cent over the same quarter of 1949 and 6 per cent ahead of the record third quarter last year.

Average employment was 396,261. payroll, $355 million.



Annealing and heat-treating operations include spheroidize annealing, solution and under-critical annealing, isothermal annealing and oil and water quenching.

STANDARD STRUCTURAL ALLOY
BEARING QUALITY • ALLOY TOOL
SPECIALTY • NITRALLOY
CARBON TOOL • STAINLESS
MAGNAFLUX — AIRCRAFT QUALITY

COPPERWELD STEEL COMPANY, WARREN, OHIO

117 Liberty Street
New York, New York

176 W. Adams Street
Chicago, Illinois

P. O. Box 1633
Tulsa, Oklahoma

1578 Union Commerce Building
Cleveland, Ohio

7251 General Motors Building
Detroit, Michigan

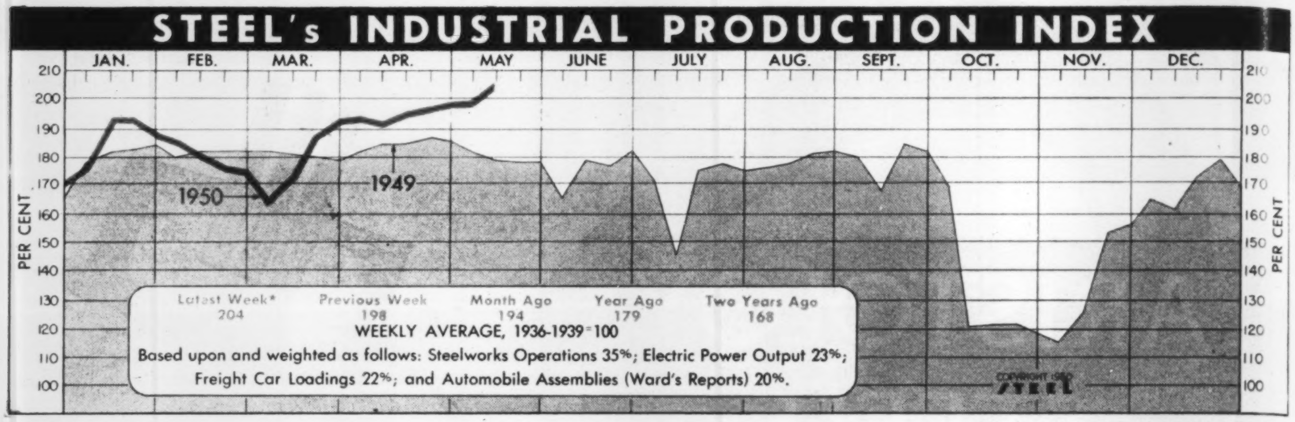
403 W. Eighth Street
Los Angeles 14, California

528 Fisher Building
Detroit, Michigan

3104 Smith Tower
Seattle, Washington

Monadnock Building
San Francisco 5, Calif.

STEEL's INDUSTRIAL PRODUCTION INDEX

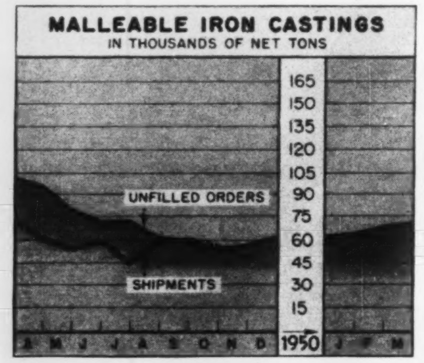


Latest Week*	Previous Week	Month Ago	Year Ago	Two Years Ago
204	198	194	179	168

WEEKLY AVERAGE, 1936-1939=100

Based upon and weighted as follows: Steelworks Operations 35%; Electric Power Output 23%; Freight Car Loadings 22%; and Automobile Assemblies (Ward's Reports) 20%.

* Week ended May 13 (preliminary)



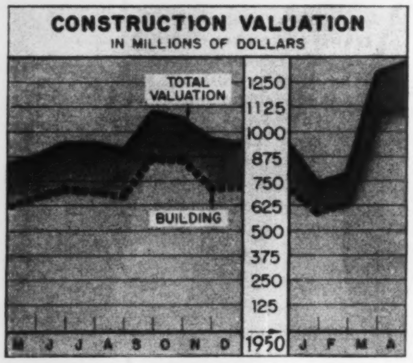
Charts—Copyright 1950, STEEL

Malleable Iron Castings

Thousands of Net Tons

	Shipments 1950	Shipments 1949	Unfilled Orders* 1950	Unfilled Orders* 1949
Jan.	62.9	71.9	62	126
Feb.	60.4	66.7	67	118
Mar.	66.3	72.1	70	102
Apr.	...	61.3	..	95
May	...	54.6	..	79
June	...	59.6	..	70
July	...	44.4	..	71
Aug.	...	58.1	..	61
Sept.	...	60.5	..	58
Oct.	...	57.2	..	54
Nov.	...	49.4	...	56
Dec.	...	57.4	..	61
Total	...	713.1		

* For sale. Bureau of the Census

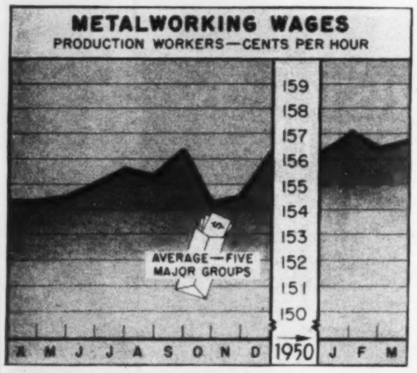


Construction Valuation

(37 States)—In Millions of Dollars

	Total 1950	Total 1949	Building 1950	Building 1949
Jan.	730.9	483.0	578.8	381.0
Feb.	779.5	568.5	627.0	415.0
Mar.	1,300.2	747.6	1,075.3	579.2
Apr.	1,350.5	842.6	1,123.5	620.2
May	....	880.3	....	666.9
June	....	945.7	....	706.7
July	....	943.6	....	690.9
Aug.	....	905.7	....	671.5
Sept.	....	1,093.7	....	870.6
Oct.	....	1,061.8	....	857.8
Nov.	....	957.8	....	701.3
Dec.	....	929.0	....	722.2
Total	....	10,359.3	....	7,883.3

F. W. Dodge Corp.



Metalworking Hourly Wages

Production Workers—Five Major Groups

1949	Prim. Mtls.	Fab. Prod.	Mach-inery	Elec. Mchy.	Trans. Equip.
Jan.	159.1	145.3	152.4	143.6	166.0
Feb.	159.3	145.4	152.4	144.0	165.3
Mar.	158.7	145.2	152.5	144.5	163.7
Apr.	158.2	145.2	152.3	144.4	164.3
May	158.4	145.3	152.3	144.3	165.0
June	158.1	146.4	152.9	144.0	165.8
July	159.1	146.6	153.0	144.7	166.1
Aug.	158.1	146.8	153.1	145.1	166.0
Sept.	160.7	147.4	153.8	144.7	167.4
Oct.	155.6	145.9	153.6	143.5	165.6
Nov.	158.0	145.1	153.8	143.5	166.2
Dec.	159.7	147.2	154.3	144.6	168.4
1950					
Jan.	161.5	148.8	154.7	144.5	168.3
Feb.	160.2	148.2	155.3	144.5	167.5
Mar.	160.3	148.0	156.1	144.8	168.1

Bureau of Labor Statistics

Issue Dates of Other FACTS and FIGURES Published by STEEL:

Durable Goods	Apr.24
Fab. Struc. Steel	May8
Forgings, Steel	Apr.3
Fdy. Equip. Orders	May15
Frght. Car Backlog	May15
Furnaces, W. Air	May8
Gear Sales	May8
Gray Iron Cast.	Apr.24
Ind. Fur. Orders	May15
Indus. Prod.	May8
Ironer Sales	May15
Machine Tools	Apr.24
Price Indexes	May1
Pumps, Orders	May1
Purchasing Power	May8
Radio, TV Output	May15
Ranges, Elec.	May1
Ranges, Gas	Jan.2
Refrigerators	May1
Steel Castings	Apr.24
Trucks, Elec. Ind.	Jan.2
Vacuum Cleaners	May1
Washer Output	May15

Malleable Business Is Better

Malleable foundries in common with the entire foundry industry are up off the floor and doing better. Business began to improve late in the spring and is currently above the March level shown in the accompanying chart.

The automotive industry is the biggest customer of the malleable foundries and business should stay good as long as cars and trucks roll off assembly lines in good volume. Another hopeful sign is the mild improvement in freight car ordering. The railroads consume 8 to 10 per cent of all malleable castings and when freight car buying hit the skids a year ago many foundries were hard hit.

Another Construction Record Set

For the second consecutive month construction records for building and heavy engineering contract awards were broken in April. F. W. Dodge Corp. reports awards totaling $1,350,496,000 in the 37 states east of the Rocky mountains, topping March awards by more than $50 million. Prior to March the former record was $1,190,264,000 in June, 1942.

The latest month's figure is 4 per cent higher than in the preceding month.

Residential awards accounted for almost half the April total, reaching $674.8 million. This total is 17 per cent higher than the preceding month and 122 per cent above the April, 1949, aggregate.

Homebuilding continued at a record rate in April when 126,000 new dwellings were started. That brings the total for the first four months of 1950 to 395,000 units, 53 per cent above a year ago.

Bureau of Labor Statistics predicts 500,000 new homes will have been started by the end of May. In 1949 that level was not reached until July.

The Business Trend

Three business indicators reach new levels as steelmaking operations, the industrial production index and automobile assemblies mount. Rail strike causes little output loss

HOW high is up? How long is a piece of string? How good can business get? That third question is now as unanswerable as the first two.

Three business indicators have shot to new alltime peaks, despite the short-lived strike on four of the nation's railroads. Industrial production losses resulting from the walkout that ended May 16 were only slight.

Steelmaking operations last week soared to more than 101 per cent of capacity, a new peak. Steel ingot production for May promises to be sensational.

STEEL's industrial production index for the week ended May 13 jumped to 204 per cent of the 1936-1939 average, another new record. That compares with 198 for the week ended May 6 and 179 for a year ago.

With Chrysler making a powerful production comeback, the U. S. and Canadian auto industries for the week ended May 13 turned out 177,398 cars and trucks, the third new peak to be set among major business barometers. *Ward's Automotive Reports* predicts that May will set a new automotive output record, which, in turn, will be broken by unprecedented production in June.

Gross National Product . . .

Gross national product in the first quarter of 1950 was $264 billion, in terms of seasonally adjusted annual rates, says Commerce Department's Office of Business Economics. That measure of the market value of the nation's production of goods and services exceeded the corresponding figure for each quarter of last year and advanced about $7 billion from the fourth quarter.

Consumer demand, after a year of virtual stability, rose appreciably in the first quarter. At a seasonally adjusted annual rate of $183 billion, it was $3 billion above the previous quarter, and by a lesser margin exceeded even the high rates in the closing months of 1948. Underlying this rise in consumer demand were both an increase in the basic flow of personal income and a large refund of insurance premiums to veterans. Personal income in March, including the special insurance dividend, was at an annual rate of $222.7 billion, $3.6 billion higher than in February.

Prices . . .

Wholesale prices throughout the U. S. rose 0.3 per cent in the week ended May 9, says the Bureau of Labor Statistics. The index was 154.9 per cent of the 1926 average, 1.8 per cent above the level of four weeks ago and 0.3 per cent below the comparable week of 1949.

Metal prices rose 3 per cent and accounted for part of the rise. Steel scrap, zinc, lead and tin prices all moved upward.

Employment . . .

Employment this summer probably will equal or exceed 60 million, says Robert C. Goodwin, director of the Bureau of Employment Security. That figure was the postwar goal of federal planners and hasn't been topped since

BAROMETERS of BUSINESS

	BAROMETERS of BUSINESS	LATEST PERIOD*	PRIOR WEEK	MONTH AGO	YEAR AGO
INDUSTRY	Steel Ingot Output (per cent of capacity)†	100.5	100.5	98.0	95.5
	Electric Power Distributed (million kilowatt hours)	5,864	5,872	5,863	5,257
	Bituminous Coal Production (daily av.—1000 tons)	1,797	1,847	1,904	1,880
	Petroleum Production (daily av.—1000 bbl.)	5,118	5,058	4,999	4,955
	Construction Volume (ENR—Unit $1,000,000)	$183.3	$250.6	$177.6	$131.0
	Automobile and Truck Output (Ward's—number units)	177,398	146,337	147,657	118,199
	*Dates on request. †1950 weekly capacity is 1,906,267 net tons. 1949 weekly capacity was 1,843,516 net tons.				
TRADE	Freight Car Loadings (Unit—1000 cars)	700†	744	707	772
	Business Failures (Dun & Bradstreet, number)	217	199	201	171
	Money in Circulation (in millions of dollars)‡	$27,041	$27,051	$27,072	$27,452
	Department Store Sales (changes from like wk. a yr. ago)‡	−10%	−1%	none	+1%
	†Preliminary. ‡Federal Reserve Board.				
FINANCE	Bank Clearings (Dun & Bradstreet—millions)	$13,128	$14,599	$12,418	$12,310
	Federal Gross Debt (billions)	$255.8	$255.7	$255.4	$251.6
	Bond Volume, NYSE (millions)	$17.5	$18.8	$25.0	$15.0
	Stocks Sales, NYSE (thousands of shares)	9,396	11,613	12,683	4,052
	Loans and Investments (billions)†	$66.5	$66.5	$66.6	$61.6
	United States Gov't. Obligations Held (millions)†	$35,941	$35,920	$35,920	$32,767
	†Member banks, Federal Reserve System.				
PRICES	STEEL's Weighted Finished Steel Price Index††	156.13	156.13	156.13	152.90
	STEEL's Nonferrous Metal Composite‡	169.5	165.7	158.2	184.4
	All Commodities†	154.9	154.5	152.1	155.4
	Metals and Metal Products†	170.1	169.6	169.7	168.9
	†Bureau of Labor Statistics Index, 1926=100. ‡1936-1939=100. ††1935-1939=100.				

October, 1948. A postwar high of 61,615,000 jobs was set in July, 1948.

Mr. Goodwin adds that the goal of 60 million employed "is no longer adequate to meet the employment needs of the country."

Between January and March, employment rose in three-fourths of the nation's major production centers and in two-thirds of the areas of most severe unemployment. During the corresponding period last year, employment dropped and unemployment rose in nine of the ten areas surveyed.

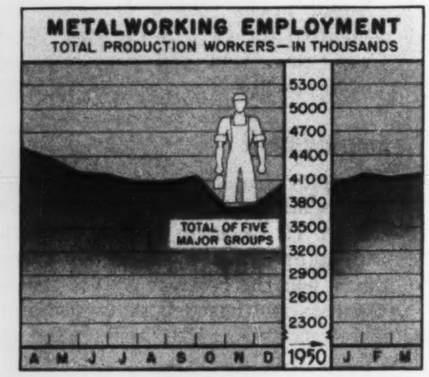
Inventories . . .

Total business inventories at the end of March were $55 billion, says the Office of Business Economics. After allowance for seasonal variations, the book value of inventories increased $500 million during march. The increase occurred in stocks held by retailers and wholesalers. Manufacturers' inventories were unchanged from the end of February.

Manufacturing Income . . .

The net income after taxes of U. S. manufacturing corporations in 1949 is estimated at about $9 billion, or 22 per cent less than in 1948. In a joint report, the Securities & Exchange Commission and the Federal Trade Commission estimate that 1949 profits reached a low in the second quarter and thereafter improved. Sales in 1949 dropped an estimated 7 per cent under 1948, while costs and expenses fell 5 per cent.

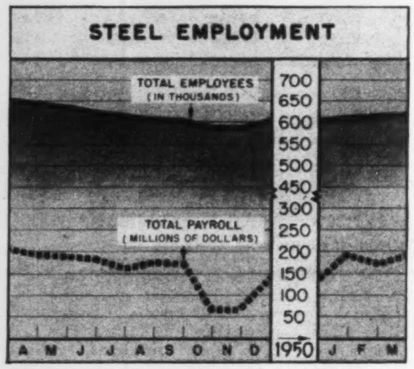
The rate of return of stockholders' equity for all manufacturing corporations in 1949 is estimated at 11.6 per cent; it was 16 per cent in 1948.



Metalworking Employment

1949	Prim. Mtls.	Fab. Prod.	Mach-inery	Elec. Mchy.	Trans. Equip.
Mar.	1,062	729	1,108	585	1,017
Apr.	1,028	706	1,066	560	1,012
May	991	683	1,014	538	955
June	971	679	977	518	995
July	934	671	939	505	1,014
Aug.	932	688	927	507	998
Sept.	938	708	935	531	1,017
Oct.	559	677	922	548	986
Nov.	737	666	908	546	898
Dec.	955	988	929	558	896
1950					
Jan.	963	693	936	561	990
Feb.	977	699	960	571	879
Mar.	983	710	982	577	890

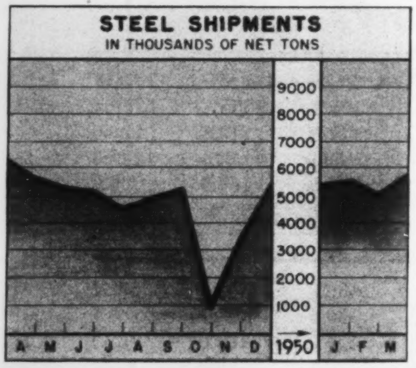
Bureau of Labor Statistics



Steel Employment, Payrolls

	Employees in Thousands		Payrolls in Millions	
	1950	1949	1950	1949
Jan.	609	650	$189.3	$202.1
Feb.	613	653	174.7	189.8
Mar.	616	652	190.0	207.2
Apr.	...	647	....	191.9
May	...	637	....	188.4
June	...	625	....	181.8
July	...	610	....	160.3
Aug.	...	603	....	175.6
Sept.	...	600	....	173.5
*Oct.	...	584	....	63.1
*Nov.	...	584	....	63.1
Dec.	...	602	....	136.9

Monthly average. * Averages taken from single figure for the two strike affected months. American Iron & Steel Institute.



Steel Shipments

Net Tons

	1950	1949	1948
Jan.	5,482,691	5,788,632	5,410,438
Feb.	5,134,780	5,519,938	5,046,115
Mar.	5,723,340	6,305,681	5,978,551
Apr.	....	5,596,786	5,096,161
May	....	5,234,862	5,321,375
June	....	5,177,259	5,476,774
July	....	4,534,855	5,229,880
Aug.	....	4,918,314	5,329,060
Sept.	....	5,236,196	5,511,474
Oct.	....	935,037	5,952,008
Nov.	....	3,296,809	5,732,256
Dec.	....	5,410,902	6,056,282

American Iron & Steel Institute

Charts—Copyright 1950, STEEL

U.S. Spending Increasing

It will prolong industry's prosperity jag, but what about the morning after?

LOOK for increased federal spending to spur short-term business activity in two ways: Indirectly, deficit financing increases the current money supply, life-blood of industry; directly, more U. S. spending will aid metalworking companies making defense and other products for the government.

When money is around in abundance and flowing well, business is usually good. For one thing, the money supply helps determine the volume of business loans. Last year when production was declining—as was the money supply — business loans of weekly reporting banks dropped 7.9 per cent in the first four months. Part of that was seasonal—paying off loans after Christmas—but part was business caution. This year business loans have fallen only 3 per cent in the first four months.

Money, Money—The money supply is now at about $168.8 billion, up $3.4 billion from a year ago. Much of that increase has come without federal financial shennanigans, but now an additional factor is coming into play: The government is going more into debt. For the week ended May 10, the gross federal debt hopped to $255.8 billion, compared with $255.7 billion for the previous week and $251.6 billion a year ago.

Deficit spending is financed partly by government bond issues. Last Monday, for example, the U. S. started a drive to sell $650 million worth of E bonds. Banks will buy the government bonds. Then, as the government spends, the newly created deposit money will go into circulation. That fiscal management may bring an economic hangover in the long run, but immediate prospects are for a prosperity jag.

Payment Deferred — When the hangover will take effect is anybody's guess, but it is certain that the U. S. will follow an out-and-out inflationary path for months to come. The federal deficit in the next fiscal year beginning July 1 is now estimated to be larger than stated in the President's January budget message. In fiscal 1951 it may reach $6.3 billion on the basis of existing taxes. The deficit will be even larger if excises are cut without a corresponding increase in other revenue.

Presidential Adviser Leon Keyserling says "these fiscal policies are raising us to new pinnacles of economic strength and prosperity." He believes that the costs of meeting the cold war threat will increase.

Boom, Boom—Federal spending for defense will be the most direct spur to metalworking activity over the coming months. Military expenses for fiscal 1951 will exceed $14 billion. That money will buy military hardware, more ships, but above all—more planes.

Chicago Business Excellent

Business is excellent in the Chicago area, reports the Purchasing Agents Association of Chicago.

April business conditions remained very good for 90 per cent of the association's members. Half of the group said the month's showing was even better than March, which was also good.

No noticeable decreases in prices are predicted for the immediate future. Inventories are higher.

Coast Firms Expanding

San Francisco area industrial firms are loosening up on expansion plans.

In the 12-county Bay region, companies in March announced plans to build 12 new manufacturing plants, at a cost of $382,400; 38 other manufacturing firms took expansion steps estimated to cost $2,553,600.

In northern California, the number of new plants and expansions announced in March totaled 53, representing a capital investment of nearly $4 million, an increase of 16.5 per cent over February's total.

Television Boosts Philco Sales

The demand for television receivers boosted Philco Corp.'s first quarter sales to $79,487,000, a 50 per cent increase over the $53,006,000 sales in the same period of 1949.

Net income in the first quarter of 1950 totaled $4,074,000, compared with $915,000 in the first quarter of last year. "Sales and earnings of Philco were the largest for any initial three months in the company's history by a wide margin," says William Balderston, president.

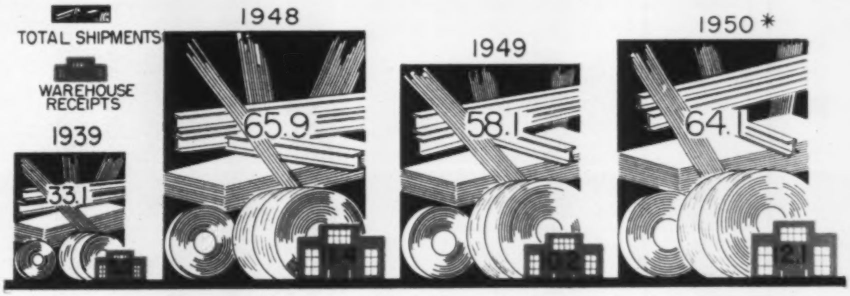
Textile Firms To Buy Equipment

The textile industry will spend $300 million in the next 12 months on capital improvements, predicts Richard H. DeMott, vice president of SKF Industries Inc. The industry already has spent more then $1 billion since the war to modernize.

Mr. DeMott bases his forecast on orders for antifriction bearings which, he says, "extend to every phase of textile operation."

Warehouses Distributing More Steel

. . . *jobbers get record 3 million tons in first quarter*



(All figures in millions of net tons.)

* Estimated on basis of first quarter shipments.

Warehouse Prospects Good for Rest of Year

WAREHOUSES may receive 12.1 million tons of steel this year, nearly 20 per cent more than they got in 1949 and about 600,000 tons more than they obtained in 1948 when receipts hit an alltime peak of 11.4 million tons (see the chart).

That estimate is based on the record 3,030,480 tons that warehouses got from mills in the first quarter.

Hard Pace To Hold—Can that rate of shipments—18.9 per cent of all steel shipped in the first three months—be kept up for the next three quarters? "Probably not," admits Walter S. Doxsey, president of American Steel Warehouse Association, "but there's an excellent chance that the rate will continue to be high. Business is good for warehouses and should remain that way for the rest of the year. The warehouse industry is being treated fairly by the steel companies." Despite the fair treatment warehouses still can't get enough flat-rolled products and coated sheets. Prospects for relief in those items are poor.

An increase in demand for small quantities of steel accounts for the high warehouse receipts, says Mr. Doxsey. Nobody knows precisely how many customers are served by warehouses, but just one segment of the industry—comprising distributors of industrial steels—has 500,000 buyers.

Three Parts—The warehouse industry consists of about 28,000 distributors. About 2000 handle industrial steels, including structurals, bars, sheets, strip, tubing and tool steel. More than 25,000 firms—ranging from mail order houses to farm co-operatives—handle merchant products, including tin and terne plate, nails and staples, barbed and twisted wire, fencing, bale ties, pipe and conduit. About 200 warehouses handle oil country goods.

The warehouse industry took 15.6 per cent of all steel shipped in 1939, 17.3 per cent in 1948, and 17.6 per cent in 1949. The trend is upward for the steel tonnage being distributed by warehouses, but more and more firms are participating in the distribution. Industrial steel distributors numbered 1400 during the war; 600 more have entered the field since then. The population in the warehouse industry generally has probably increased more than the 40 per cent gain estimated for the industrial steel segment of the business.

Putnam Sees Good Business

A continued high level of U. S. business activity through the rest of 1950 and into the first quarter of 1951 is predicted by Claude A. Putnam, president of the National Association of Manufacturers.

Mr. Putnam, who also is head of the Markem Machine Co., of Keene, N. H., bases his forecast on current operations and prospects of his business. Markem makes marking machinery.

"The Markem product," he says, "is used only by producing industries. We consider it a good economic barometer. At present we have the largest order backlog for machines in our 39-year history, including wartime."

Prices of durable goods, he believes, will continue to move higher in coming months. "Prices will reflect a continuance of high level demand," he said, "and the desire on the part of everyone to pay a top price for labor. Wages will continue to rise."

Mr. Putnam is a believer in the constantly rising economy. He predicted that the nation's industrial output will continue to expand at a 4 per cent annual rate, and "I wouldn't be surprised to see the growth accelerated."

Men of Industry

H. O. HOLLAND
. . . *vice president-sales, Automatic*

E. W. DONKEL
. . . *new president, Kent-Owens*

E. M. PLATTS
. . . *Joy Mfg. exec. vice president*

H. O. Holland, since 1947 director of sales, was elected vice president in charge of sales of all divisions of **Automatic Steel Products Inc.,** Canton, O. He formerly was vice president, Kellogg Division, American Brake Shoe Co. **John E. Carnahan** was elected vice president, Spun Steel Division.

Rudolf Lowit, formerly general manager, Elmet Division, **North American Philips Co. Inc.,** New York, was elected vice president of the division.

W. E. Haarbauer was named general superintendent, wire and weaving mills, **Reynolds Wire Co.,** Dixon, Ill.

Midvale Co., Nicetown, Philadelphia, named **L. R. Loewen** comptroller. **Francis A. Troendle** was elected treasurer and assistant secretary.

Fred M. Gillies was elected executive vice president, **Acme Steel Co.,** Chicago. He recently resigned as works manager, Inland Steel Co., with which he had served 28 years. Mr. Gillies takes over the post vacant since last fall when **Chester M. MacChesney** became board chairman.

Charles Edison, president, **Thomas A. Edison Inc.,** West Orange, N. J., for the last 24 years, was elected to the newly created position of chairman of the board of directors, and is succeeded as president by **Henry G. Riter III.** Mr. Riter has been a director since 1946 and chairman of the executive committee since 1949. He is senior partner of Riter & Co., New York investment banking firm, and chairman of the board, Copperweld Steel Co.

E. W. Donkel was elected president, **Kent-Owens Machine Co.,** Toledo, O. He fills the post vacated in March by the death of his father. Mr. Donkel spent a year with Warner & Swasey Co., and joined Kent-Owens in 1937. He has been vice president and general manager for the last six years. **Walter C. Strehlau** was elected assistant secretary and a director.

Frank W. Curtis was appointed chief engineer of the entire machine tool division of **Van Norman Co.,** Springfield, Mass., covering milling machines, oscillating grinders and Van Norman-Fitchburg production grinders. Mr. Curtis, the 1941-42 president of American Society of Tool Engineers, was previously associated with Van Norman. For the last six years he has been a consulting specialist on induction and dielectric heating, on which he has written several articles for STEEL.

FRANK W. CURTIS
. . . *chief engineer, Van Norman division*

E. M. Platts, sales vice president, **Joy Mfg. Co.,** Pittsburgh, was elected executive vice president, succeeding the late **Arthur S. Knoizen.** Mr. Platts served La-Del Conveyor & Mfg. Co. as vice president. On acquisition of La-Del by Joy Mfg. he became vice president in charge of Joy's coal equipment sales. Two years later he was placed in charge of all sales for the company, and was elected to the board of directors.

Williams Deans, chief engineer, **I-T-E Circuit Breaker Co.,** Philadelphia, was elected vice president in charge of engineering. **Gus E. Heberlein,** chief engineer, Railway & Industrial Engineering Co., subsidiary at Greensburg, Pa., was appointed manager of the switchgear division of the parent company.

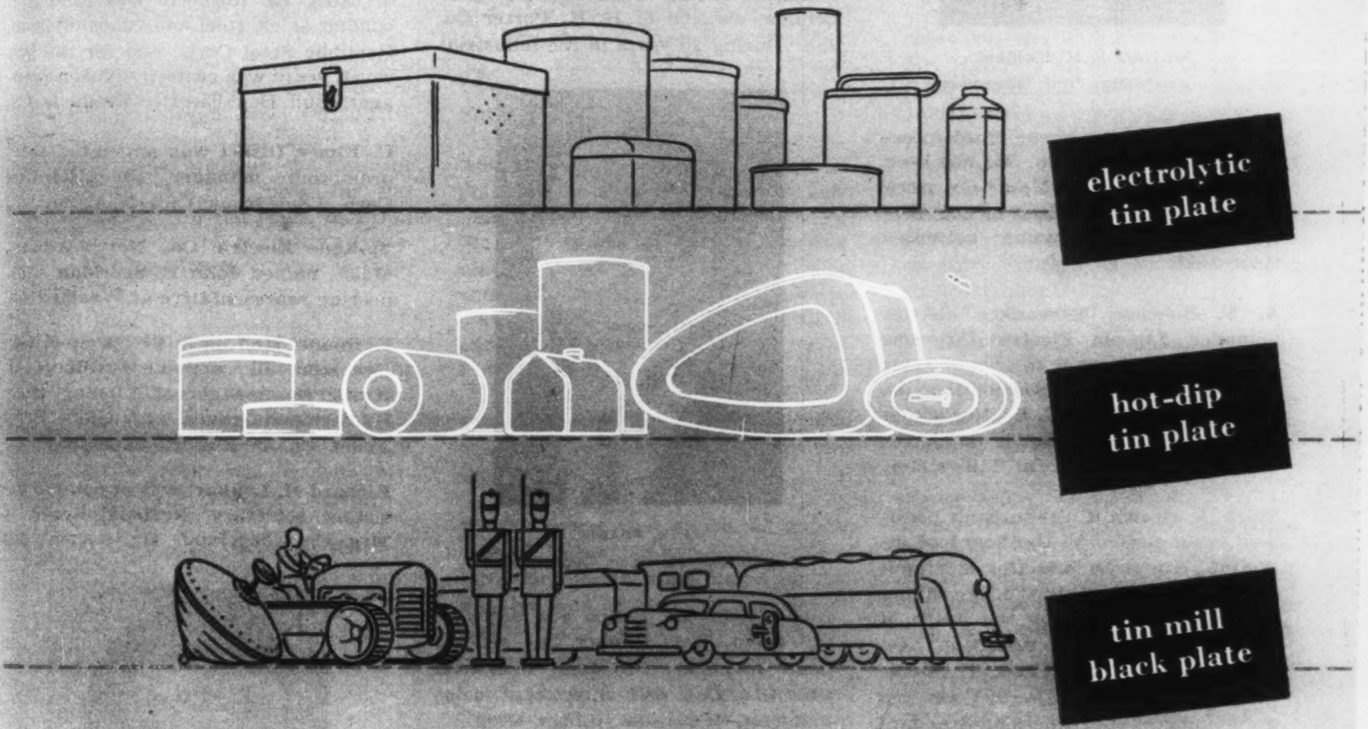
Eugene C. Bauer, vice president, **Poor & Co.,** Chicago, was elected first vice president, and continues as president of the subsidiary company, Kensington Steel Co., Chicago.

J. William Schulze was elected president, **Pennsylvania Crusher Co.,** Philadelphia. He succeeds **William S. Newell,** chairman of the board of Bath Iron Works Corp., parent company, of which Mr. Schulze is vice president. **John A. Plimpton** was elected vice president, and **John R. Newell,** president, Bath Iron Works, also was elected vice president of the crusher company.

Arthur H. Stein was named president and treasurer, **Copper-Clad Malleable Range Co.,** St. Louis. He also will assume the position of general manager of the company. Other of-for a material advantage–

WEIRITE

TIN MILL PRODUCTS



Unvarying high quality of the base steel, strict uniformity in plating and gauge of the finished plate—those are advantages you can profitably gain by using Weirite tin-mill products. Complete control of materials, from mine to mill, plus rigid process control through every step of manufacture, enables Weirton to turn out tin mill products that possess a two-way value to the user—for Weirite not only makes your finished products better, but also helps you to manufacture them easily and economically.

WEIRTON STEEL COMPANY

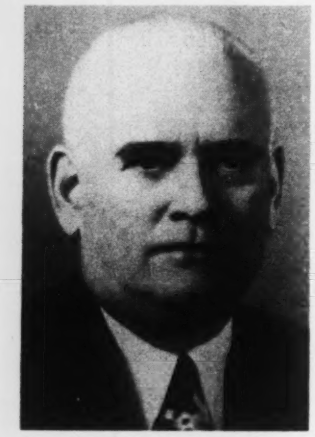
WEIRTON STEEL CO.

WEIRTON, W. VA., *Sales Offices in Principal Cities*

NATIONAL STEEL

Division of **NATIONAL STEEL CORPORATION,** *Executive Offices, Pittsburgh, Pennsylvania* ficers elected are **Charles R. Binns,** vice president; **Roland M. Hoerr,** vice president; and **Herbert L. Hetzler,** secretary.

William R. Loughran was appointed general purchasing agent, **Ford International Co.,** New York. He has been associated with Ford Motor Co. since 1914, and has specialized in domestic and overseas purchasing activities since 1925.



WILLIAM R. LOUGHRAN
. . . purchasing, Ford International

A. F. Boucher, Milwaukee district manager, **Lincoln Electric Co.,** was transferred to Detroit to assume sales and engineering responsibilities as district manager. **I. R. Bartter** transferred from Grand Rapids, Mich., to succeed Mr. Boucher at Milwaukee.

Mark A. Brown, Chicago bank president, was elected to the board of directors, **American Radiator & Standard Sanitary Corp.,** Pittsburgh, filling the vacancy caused by the death of **Robert B. Dickson,** president, Kewanee Boiler Corp. **Clark T. Morse,** president, American Blower Corp. and a member of American-Standard board of directors, was appointed to the executive committee, a post which Mr. Dickson also held.

Halsey J. Sorrell, manager, Decatur, Ill., plant, plastics division, **General Electric Co.'s** chemical department, was appointed to sales duties with headquarters in Chicago. He is succeeded at Decatur by **Henry Semler,** former general superintendent, McQuay-Norris Mfg. Co. at Indianapolis.

George Hamburger, manager, St. Louis district, **Copperweld Steel Co.,** was promoted to the position of manager of communication sales covering the entire United States.

Westinghouse Electric Corp. announces that two of the company's key officials have exchanged positions. Vice President **W. O. Lippman,** formerly in charge of plant labor relations, becomes head of Westinghouse Elevator Division at Jersey City, N. J., and Vice President **Tom Turner** leaves the elevator division to take charge of plant labor relations with headquarters in Pittsburgh. **B. M. Brown** was appointed manager of special accounts for the corporation.

J. L. Hiers was appointed district sales manager, **Woodhouse Chain Works,** Trenton, N. J. He will be in charge of sales activities in northern New Jersey, New York and western Pennsylvania.

J. R. Keach was appointed general manager, **Quaker Rubber Corp.,** Philadelphia, division of H. K. Porter Co. Inc. During 25 years in the industrial rubber field, Mr. Keach was purchasing agent, Ohio Rubber Co., general plant manager, Firestone Industrial Products Co., and directional sales manager, Hamilton Rubber Corp.

J. R. KEACH
. . . general manager, Quaker Rubber

Promotion of **Albert P. Hayden** as superintendent of wire rope and tramway engineering, Worcester, Mass., **American Steel & Wire Co.,** subsidiary, U. S. Steel Corp., and **John A. Herr** to assistant superintendent of this department was announced by the Worcester district manager of operations. In his new capacity Mr. Hayden succeeds **Gordon H. Bannerman,** recently named manager of a newly created tramway division, Columbia Steel Co., western subsidiary of U. S. Steel.

Grede Foundries Inc., Milwaukee, appointed **James L. Bird** plant manager, Liberty Division, Wauwatosa, Wis.; **Eugene Schneider,** plant manager, Milwaukee Steel Division; and Leslie **Woehlke,** plant manager, Spring City Division, Waukesha, Wis.

George S. Case Jr. is the newly elected president of **Lamson & Sessions Co.,** Cleveland. He succeeds **Roy H. Smith,** who becomes board chairman. **George S. Case Sr.,** who became president in 1929 and board chairman in 1938, was elected chairman of the executive committee. **H. H. Winterberg** was elected treasurer in addition to secretary. New vice presidents are **Alexander M. Smith,** in charge of manufacturing, and **Harold J. McMahon,** in charge of operations.

Herbert H. Benfield has become associated with **Gedney Electric Co.,** New York, as vice president in charge of sales. He formerly was manager, conduit sales, steel and tubes division, Republic Steel Corp., and for the last seven years was eastern division manager, Bull Dog Electric Products Co.

C. Elmer Gishel was appointed sales promotion manager for **Heli-Coil Corp.,** Long Island City, N. Y.

Sprague Electric Co., North Adams, Mass., named **John P. Sheridan** engineering representative at Washington.

Korhumel-Heffron & Preiss Steel Co., Evanston, Ill., appointed **Gilbert H. Krohn** as manager of tubular sales. He formerly served with Globe Steel Tubes Co. in a sales capacity.

Richard H. Leukart was appointed assistant secretary, **National Screw & Mfg. Co.,** Cleveland. He is succeeded as director of industrial relations by **Paul W. Best,** who joined the company in 1944 as labor relations supervisor.

RICHARD H. LEUKART
. . . National Screw asst. sec'y

Trumbull Electric Mfg. Co., Plainville,

AARON P. LEVINSON
. . . Levinson Steel president

HENRY L. TOLAN
. . . secretary and director, Dodge Steel

THOMAS A. HAMMER JR.
. . . Doehler-Jarvis asst. treas.

Conn., appointed **James P. Nolan** organization supervisor, and **Robert G. Page,** designing engineer.

Aaron P. Levinson, secretary and general sales manager, was elected president, **Levinson Steel Co.,** Pittsburgh. He succeeds his father, **S. M. Levinson,** who becomes chairman of the board. The new president has been secretary for ten years, and that post is filled by the company's treasurer, **Jack Levinson,** now secretary-treasurer.

Albert E. Bickell was appointed Pittsburgh assistant district sales manager, **General Refractories Co.,** to be effective on or about June 15. **George L. Peck,** with the Pittsburgh office since 1948, will replace Mr. Bickell in the Philadelphia office.

Twin Coach Co. elected **Earl H. Lenz** vice president in charge of bus production at its plants in Ft. Erie, Ont., Canada, and Kent, O.

Henry L. Tolan was appointed secretary, **Dodge Steel Co.,** Philadelphia, and also was elected to the board of directors. Other new members on the board are **John R. Baush, Chester S. Roberts Jr.,** and **John J. Sullivan.**

American Engineering Co., Philadelphia, appointed **John C. Mevius** sales manager of its hydraulic division. For the last ten years he has been sales manager, materials handling division, and continues to be responsible for materials handling sales. He will be assisted in hydraulic sales by **G. A. Fleck.**

John Neuman was appointed plant manager, **Midland Die & Engraving Co.,** Chicago.

W. G. Young was appointed special representative assigned to general sales for **Sharon Steel Corp.,** Sharon, Pa. He was manager of the Sharon district sales for the last 25 years.

Thomas A. Hammer Jr. was elected assistant treasurer, **Doehler-Jarvis Corp.,** New York, and **Irving R. Warshow** was elected assistant controller. Mr. Hammer served the Doehler Die Casting Co. and subsequent Doehler-Jarvis Corp. as controller in the company's Batavia, N. Y., plant, chief accountant of the corporation, and assistant to the treasurer. In 1947 Mr. Warshow transferred from the Chicago plant to the New York executive offices as an assistant to the controller.

William J. Fish was named a representative for **Soss Mfg. Co.** to cover Minnesota, North and South Dakota, and western Wisconsin. He is located in Minneapolis.

Erson V. Ogg was appointed director of industrial engineering, **Chase Brass & Copper Co. Inc.,** subsidiary, Kennecott Copper Corp. He previously was operating vice president, McConway & Torley Corp., in Pittsburgh.

OBITUARIES . . .

Russell Davis, 55, a special accounts representative for **Chain Belt Co.,** Milwaukee, and former executive vice president of Lustron Corp., Columbus, O., died May 13.

Dr. R. C. Mason, 47, scientist of **Westinghouse Electric Corp.,** Pittsburgh, died May 12. He was one of a group of Westinghouse scientists sent to the atomic bomb project at Oak Ridge, Tenn., in 1946 to study problems of atomic power plant development.

Edwin G. Mitchell, 68, former owner and manager, **Fell Foundry,** Ogdensburg, N. Y., died May 9.

William S. Leslie, 83, chairman of the board, **A. C. Leslie & Co.,** Montreal, Canada, steel and metal merchant, died May 6.

Charles F. Wray, 78, secretary-treasurer of both **Henry Wray & Son Inc.,** and **National Brass Mfg. Co.,** Rochester, N. Y., died May 8.

W. H. Weaver, 56, superintendent of industrial relations, Fairfield steel works, **Tennessee Coal, Iron & Railroad Co.,** Birmingham, died May 5.

William E. Brown, retired manager, central station division, New York district, and New York district sales manager of **General Electric Co.,** Schenectady, N. Y., died May 8.

C. E. Skinner, 84, retired executive, **Westinghouse Electric Corp.,** Pittsburgh, died May 12. He was the first director of research for the firm, and a past president of American Institute of Electrical Engineers.

Andrew Freiburger, 77, former general superintendent, **Worden-Allen Co.,** Milwaukee, structural fabricator, died May 12.

Stephen A. Poyer, 74, who retired as secretary, **Chicago Bridge & Iron Co.,** Chicago, in 1945, died May 13.

Charles L. Rice, 70, former vice president, **Western Electric Co.,** Chicago, died May 15.

Guy S. Hyatt, 45, department comptroller, apparatus department, **General Electric Co.,** Schenectady, N. Y., died Apr. 30.

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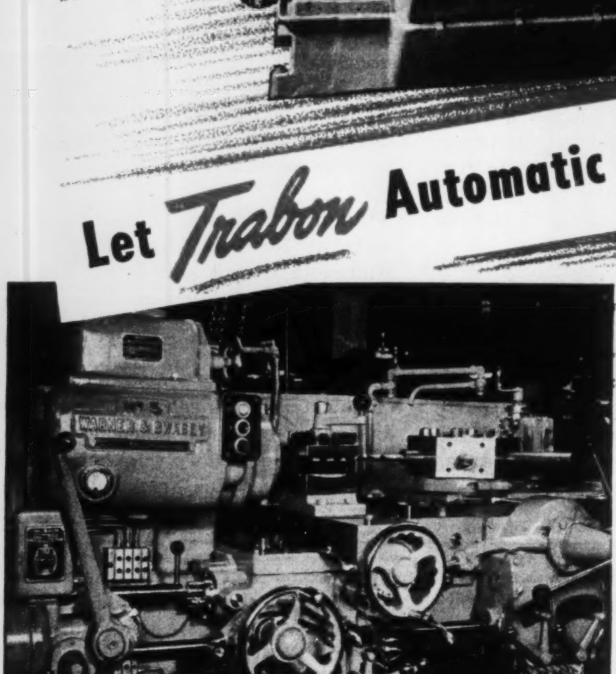

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Production AND Engineering
NEWS AT A GLANCE

STANDS THE GAFF—Sometimes, if you can't find the proper production aid, the thing to do is develop it yourself. That is how Solar Mfg. Co., Chicago, solved its problem of press forming polished aluminum and other materials without the use of paper or similar material for protection. With some outside assistance, the company developed a modified plastic coating that can take rough treatment both in regard to bends in the brakes as well as during handling. It is either sprayed on or roll coated.

"WORKING" BRIDGE— Two problems in machining a one-piece cast aluminum outboard motor transmission housing —accurate locating and clamping of a large part with its streamlined contours and holding an accurate 90-degree angle between drive and propeller shaft bores—were overcome by some unusual tooling on a standard precision boring machine, according to Ex-Cell-O Corp., Detroit. In the setup, a special bridge serves as a work-holding fixture. At the rear, it supports a spindle slide for operations at the drive shaft end of the housing. The spindle carries three single-point tools which precision bore, plunge face and chamfer the drive shaft bearing hole. The machine table serves as the second spindle slide at right angle to the first. It includes three tools on the slide and four that do not move. The seven tools perform operations at the propeller shaft end of the housing.

FLASH WELDING—WITHOUT FLASH— Percussion welding techniques are successfully adapted to miter welding extruded aluminum sections without producing any flash by a new system reported by Reynolds Metals Co., Louisville. Method permits flash welding period to be reduced appreciably while confining the pushup to a hammer blow to obtain percussion welding advantages. Dies used permit a closer grip on the work and exert a pinching action to pinch off the flash. As a result, upset metal that originally extended for ¼-inch across the weld zone to create much work in finishing is reduced to a mere line—practically eliminating need of weld finishing.

FAST FLAW DETECTOR— Surface flaws and cracks in metals are detected quickly by use of a new "oil-powder" method developed by the Naval Engineering Experiment Station, Annapolis, Md. In the technique, according to the Department of Defense, a film of penetrating oil first is applied to the surface being inspected, then removed after a short time. Defects show up in red against a white background after the area is dusted with a nonabrasive detecting powder.

ACCURATE MOTOR STARTING— Starting a synchronous motor used to be a job that required infinite patience, fast action and a sixth sense on the part of the operator. Now, Westinghouse Electric Corp. reports, the job is done surely, safely, quickly and with highly accurate timing with a new Slipsyn automatic starter. Heart of the unit is a synchronizing relay—a simple device that applies the field not only at the proper speed, but also at the most favorable rotor position. It can be adjusted to operate over a range of frequency of the induced field current of 1 to 3.5 cycles—corresponding to 94 to 98 per cent motor speed (based on a 60-cycle motor). Starter also includes a pull-out relay to protect the motor in case it fails to synchronize, or if the motor pulls out of step after once being in synchronization.

FILE HARD CASES—Recent innovation in heat treating is a batch type furnace capable of producing extremely thin file hard cases on steel parts. Of special construction, it permits heating far in excess of normal rates. Work from the furnaces is quenched under a hood so that contact of hot metal with air is eliminated. Although the unit is designed for light case work, it has complete utility for producing deep cases of the carburized or dry cyanide type. (p. 74.)

FAST "DEFLASHER"—Removal of flash on stainless steel wire used by Hotpoint in the manufacture of dishwashers is accomplished on a production basis through a combination cutting and shearing action of a special machine. The unit brings into play a two-step carbide cutter employing two offset cutting edges. Force required to effect flash removal on the hardened stainless steel is reduced greatly by the offset cutting action, and work surface at the weld is left clean and bright. (p. 77)

MUST FIT THE JOB—Every welded structure, large or small, becomes a component and, as such, an important part of a finished product. Quality of the finished product is no greater than the quality of its individual parts—that of the basic material and that of the weld binding the materials into an integral unit. For this reason it is of great importance to "tailor-make" a quality control program to fit the needs of the shop. If the work processed is simple, a simple inspection program should guarantee that all welds will be of proper quality. If products are complex more complex control safeguards may be in order. (p. 80)

"WEATHERIZED" MATERIAL — Excellent corrosion resistance of malleable iron castings recommend them for many services requiring constant, and sometimes perpetual exposure to weather. Because of this, the automotive industry, in normal times, uses over a half-million tons of the material annually. Both the agriculture and railroad interests lean heavily on malleable castings for the same reason. (p. 86)

News Summary—p. 43 *Market Summary—p. 127*

Practical Controlled-Atmosphere Furnace Applications

REDUCE H

FIRST attempt at providing the commercial heat treater with atmosphere heat-treating equipment was probably in the limited field relating to batch-type case hardening and scale free heating of tool steels and other small parts. For most other operations the commercial heat-treater had to depend upon direct fuel-fired or electrically heated furnaces without atmosphere control. He was confronted with the choice of packing work in boxes or accepting the alternative of scaling with subsequent cleaning and inevitable requirement.

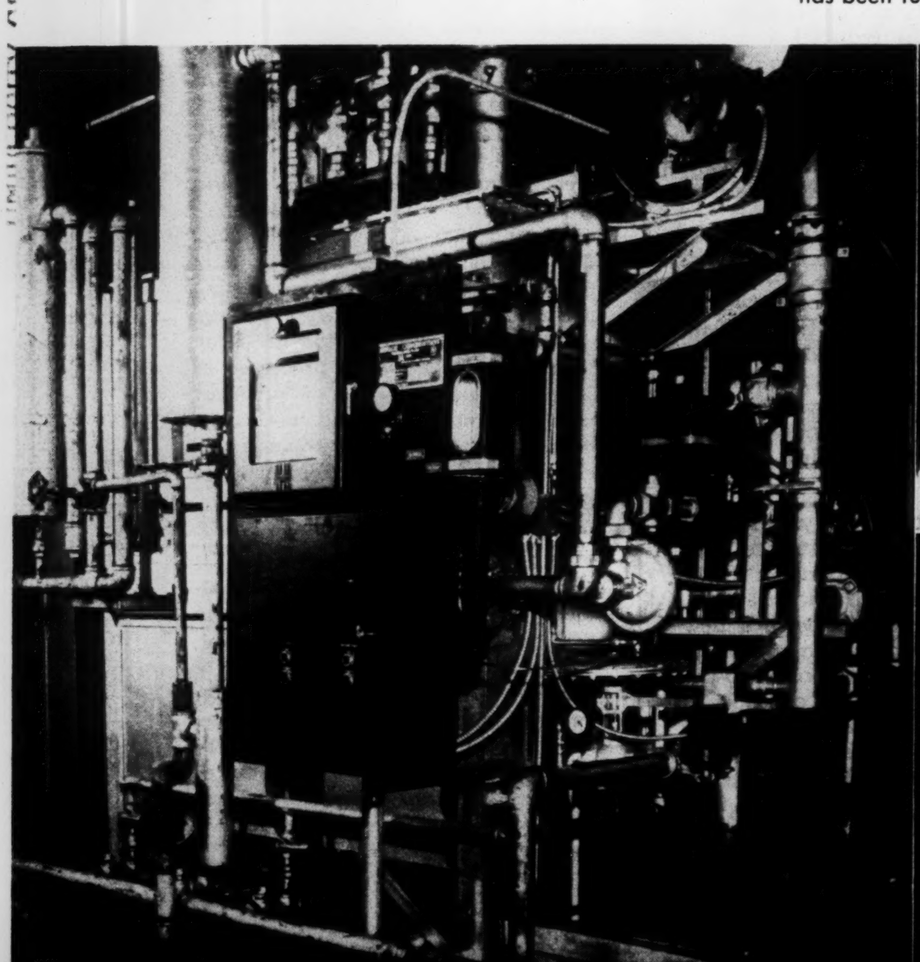
At the present time there are only a few heat-treating operations which can be conducted in a large special furnace, but which cannot be duplicated in smaller and often more flexible furnaces. These latter are necessarily a matter of greatest concern to the commercial heat-treater. Also, there is a choice of small capacity gas generators capable of producing a wide variety of different types of atmospheres. Most important, these furnaces and generators are of such design that the operation has been simplified and need not cause concern in the smallest plant.

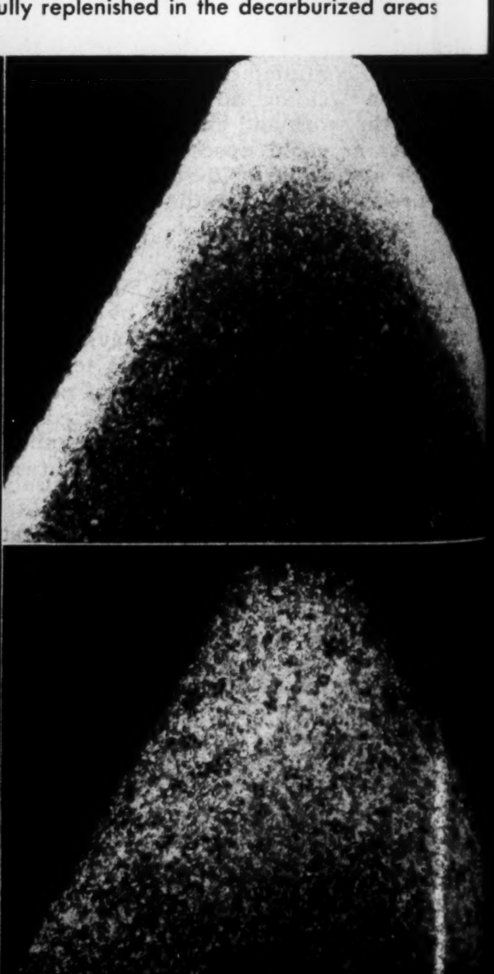
Protective Atmosphere—Suppose a commercial heat treater is called upon to anneal cold rolled or hot rolled and pickled stampings, or suppose he receives an order for annealing forging blanks which have been sand blasted for inspection purposes. Of course these parts can be annealed in an open fired furnace and cleaned after the operation. However, cleaning is never a cheap job. On the other hand these parts can be treated in a furnace from which all air or flue gases are excluded by the addition of a protective atmosphere which will not oxidize the steel. The work comes from the furnace bright and clean and is ready for shipment. Atmosphere gas providing the protection for this annealing operation can be produced by a gas generator of any desired capacity from 250 cubic feet per hour upwards.

It may cost as little as 2 one hundredths of a cent per pound of metal treated for this atmosphere. What does it cost to pickle or to otherwise clean scaled work?

This same generator may be used to provide atmosphere for most brazing or silver soldering operations and is widely used for copper brazing. The furnace may be a batch-type or a continuous furnace but its design is not important as long as it is tight enough to permit proper use of the atmosphere gas.

Fig. 1 (left)—Typical endothermic RX atmosphere generator. Fig. 2 (right)—Carbon restoration on rolled thread SAE 1035 cap screw. Upper view shows cap screw thread section as rolled. Lower view shows a section of the same bolt after hardening in a carbon restoring atmosphere. Note that the carbon has been fully replenished in the decarburized areas





By O. E. CULLEN
Chief Metallurgist
Surface Combustion Corp.
Toledo, O.

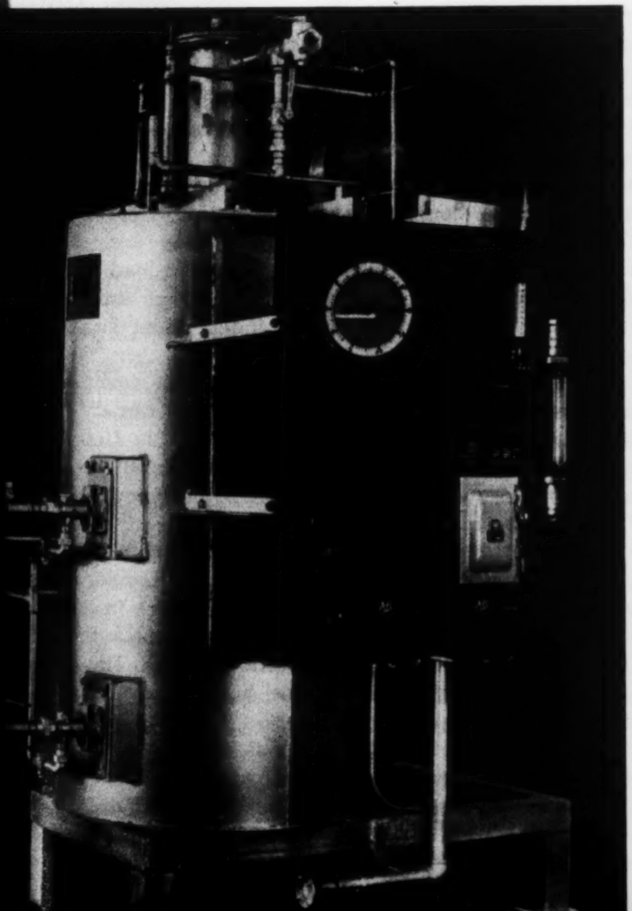
HEAT TREATING COSTS

Proper choice of atmosphere generating equipment and furnaces can spell the difference between efficient and inefficient operation of any commercial heat treating plant where versatility is a primary requirement

Suppose scale prevention is not the only consideration. Gears are to be carburized or medium or high carbon steel shafts are to be hardened, without surface decarburization. This can be taken care of by packing in compound, chips or other materials. This requires labor for loading and emptying boxes and also extra fuel for heating the containers and packing materials. The results are not always what we expected and scrap losses may be high. Quenching parts from boxes is not exactly a pleasant or a cheap operation.

Catalytic Type Generators—There is a rapidly increasing use of controlled atmospheres where any phase of carbon control in steel is required. Generators of the catalytic type which reform air-hydrocarbon gas mixtures to produce atmospheres containing about 20 per cent carbon monoxide, 40 per cent hydrogen and about 40 per cent nitrogen are in common use, Fig. 1. Capacities vary from 250 to 5000 cfh or more. This gas is mixed with additional hydrocarbons such as natural gas or propane to provide a carburizing atmosphere and is also used alone to provide a nondecarburizing atmosphere for hardening most medium carbon steels. The addition of the hydrocarbon gas can be controlled to such a fine degree that soot is practically eliminated and the surface carbon concentration of carburized stock is controlled to any desired amount between 0.80 and 1.2 per cent.

Fig. 3—AX generator for providing dissociated ammonia atmosphere gas



This is an important consideration at this time. You may be assured that the trend in carburizing is towards close control of surface carbon and the allowable limits are being lowered to between 0.80 per cent C and about 1.00 per cent C. We know of no more accurately controlled method for obtaining these values than through the use of the catalytic type of gas generator.

When this type of atmosphere is used alone in a tight furnace, its composition can be further controlled at the generator to produce a furnace atmosphere in excellent balance with the steel being heated. Thus it is a relatively easy matter to heat treat the steel without surface decarburization and without adding higher carbon to the surface.

Carbon Restoration—A more recent development of this carbon is *carbon restoration*. Suppose a customer brings in a quantity of bolts which had been roll-threaded and had originally been made from bar stock which had 0.010-inch decarburization on the surface. The problem of heat treatment becomes relatively easy if the bolts are heated for hardening in a tight furnace with an atmosphere from the catalytic generator, Fig. 2.

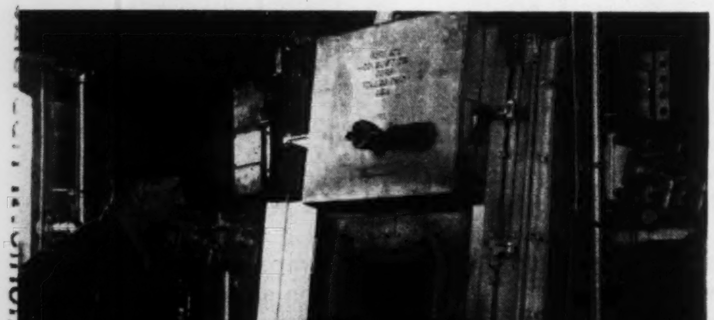
One company is hardening such recarburized bolts at the rate of almost 5000 pounds per hour and keeps five furnaces going on this job alone. One Cleveland heat treater has successfully turned out recarburized work by judicious use of this atmosphere in a belt hardening furnace. The demand for carbon restoration on all sorts of parts is increasing and it will be profitable to be ready to meet this demand.

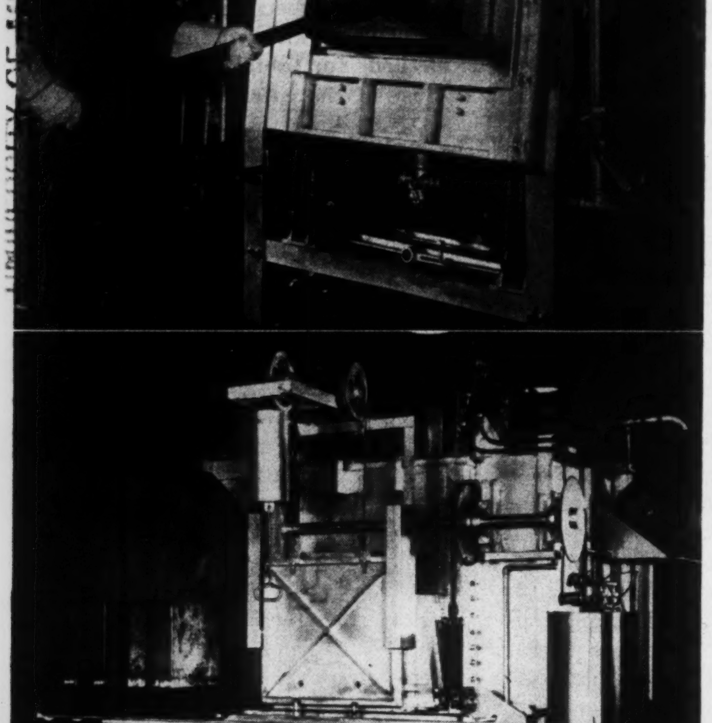
Gas Cyaniding—The catalytic generator type of atmosphere has other uses. A very important one is dry cyaniding which is often called carbo-nitriding or gas cyaniding. This presents advantages which are not obtained by any other method. For certain applications, file hard cases are produced by slow cooling the work after dry cyaniding. The types of cases produced by quenching and by slow cooling are quite similar. Parts treated may vary from heavy sections to lightweight parts such as thrust washers, lock nuts, etc.

The dry cyaniding operation requires substantially the same furnace equipment as carburizing or clean hardening. The catalytic generator is a necessity and a supply of ammonia must be provided. Ammonia does not present a difficult handling problem.

Fig. 4 (top)—Surface Combustion Balco atmosphere furnace with built-in RX generator. This unit is used for clean hardening, dry cyaniding, carburizing, etc.

Fig. 5 (bottom)—Modern rapid heating high production batch-type furnace. It is especially adaptable to dry cyaniding but also suitable for case carburizing, clean hardening and other treatments





Ammonia gas is utilized in another generator which to date has more limited use than the types above described. The ammonia dissociator which breaks down vaporized ammonia, resembles the catalytic generator in appearance and size, Fig. 3. It produces a product gas which consists of 75 per cent hydrogen and 25 per cent nitrogen and so little water vapor that the dew point of the gas is approximately −60° F. This atmosphere is expensive to generate due to ammonia cost and therefore is used only in cases where the product treated warrants the expenditure. Its chief uses are for bright annealing or hardening stainless steels and for annealing some precious metals.

Type of Furnace Important—Type of furnace used is of equal importance with the choice of a gas generator. Prime requisites for the furnace are tightness of construction, segregation of flue gases in fuel fired furnaces and proper protection of heating elements in electrically heated furnaces. All door openings must be vestibuled or otherwise sealed off to prevent infiltration of air. If permanent openings are necessary, curtains or flame screens should be provided and the furnace atmosphere must be sufficient in volume to furnish the necessary seal by maintaining a positive pressure of atmosphere gas in the furnace.

Continuous furnaces such as the pusher tray, roller hearth and belt type are quite extensively used for bright annealing, carburizing, clean hardening and dry cyaniding. They are particularly advantageous for heat-treatments involving large tonnages and fairly constant heat-treating demands.

Batch-Type Furnaces—Batch-type furnaces find considerable utility in contemplated heat-treating. They are particularly useful for the handling of work in relatively small batches or where a variety of treatments are required. These batch-type furnaces are available in sizes capable of treating a few hundred pounds or as much as 5000 pounds at a time and are used for all the processes described above.

Batch-type furnaces of several types including the pit can be obtained with an integral catalytic generator. These self-contained units have special utility in the commercial heat-treating field where controlled atmosphere requirements may vary from furnace to furnace as well as from load to load, Fig. 4. Atmosphere adjustments on the integral units are just as easy to make as on the independent gas generators.

A recent innovation in the batch-type furnace is one designed primarily for producing extremely thin file hard cases on steel parts. Up to this time the production of these cases from 0.001 to 0.005-inch in thickness was confined to salt bath cyaniding. Reason for this is easily understood when we consider that the time required to produce this shallow case is only a matter of a few minutes at temperature whereas the normal heating to temperature in a conventional controlled atmosphere furnace is a matter of considerably longer time. As a result the case actually put on the steel during heating up exceeded the total case requirements.

This new type furnace, Fig. 5, is of special construction which permits heating rates far in excess of the normal rates. Thus (*Please turn to Page 100*)

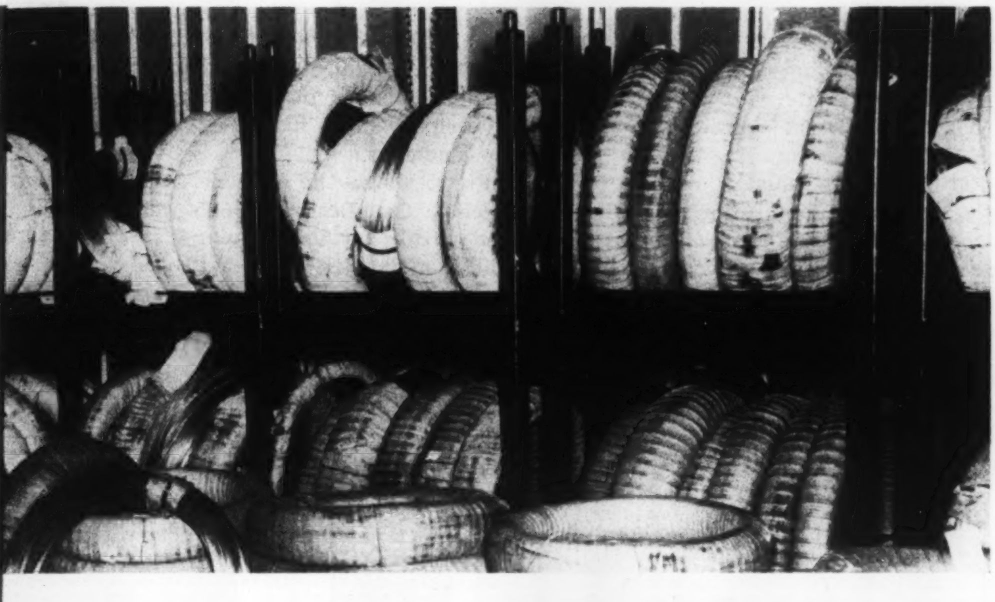


Fig. 1 — Stainless steel wire coils are stored according to wire diameter in these special steel racks which can be tiered to the ceiling if necessary

How Hotpoint Fabricates Dishwasher Baskets From Stainless Steel Wire

By ERLE F. ROSS
Chicago Engineering Editor, STEEL

Photography by Dan Reebel

ELECTRIC dishwashers manufactured by Hotpoint Inc. are front-opening units containing a wire basket in which dishes and silverware are placed and remain during the automatic washing cycle. This basket slides forward for loading or unloading when the hinged water-sealed door on the front of the cabinet is opened and lowered 90 degrees.

Two years ago, Hotpoint transferred its dishwasher manufacturing operations from its Chicago plant to Milwaukee, where it had purchased a war plant from the War Assets Administration. At that time, the company was embarking on a $20 million plant expansion program and this relocation provided the opportunity not only to increase substantially its capacity for production of dishwashers but also to improve its manufacturing procedures through installation of more efficient equipment and better plant layout.

The new line started in March, 1948, and was in full production by summer. STEEL for May 1, 1950, page 94, described the fabrication and assembly of cabinets and tubs. This article is concerned with the forming, assembly, welding and finishing of the wire baskets which support the dishes within the dishwasher tubs.

So that these baskets may be corrosion resistant and enduring, they are made from 18-8 chromium-nickel stainless steel wire in diameters ranging from 0.040 to 0.193-inch (approximately 18 to 5 gages). It is received from the mill in coil form, wrapped for the most part, and stocked in specially-designed steel stacking racks according to diameter (Fig. 1). Advantage of this type of storage is that the racks may be tiered up to the ceiling if necessary to conserve floor space. Coils are placed in the racks or removed from them by a monorail hoist.

Wire Cut to Length and Formed—As needed, the wire coils are placed on one of several Nilson four-slide wire forming machines to be cut to lengths and formed to one of the several shapes required for the baskets. One machine is shown in Fig. 2. On emerging from the machines, the formed wires drop into steel tote pans for transportation to the next operation.

Hotpoint produces all of the intricate shapes which make up the basket. Most of the wires are finish-formed in the Nilson machines, but some, such as those which constitute frame sections for the baskets, require additional operations, and to perform these the company's engineers developed and built several special air-actuated forming tools like the one shown in Fig. 3.

Wires already cut to length are given a preliminary forming in the dies mounted on the horizontal arm of the machine. As formed in this first step, the wires are hung by the operator on one of the pins of an adjacent caster-mounted rack similar to the one shown at the right in Fig. 3. When a sufficient number of wires have been racked, the operator moves to the front of the machine and passes the wire sections through two sets of forming dies mounted vertically. In the dies at the left, the wire has its two ends bent parallel. This accomplished, the operator removes the wire, inverts it and places it in the dies at the right to have the two ends bent at right angles to form a closed loop.

Some parts of the basket are rings of varying diameter and these are formed in an adjustable Bliss ring forming machine. All rings, as well as the special shaped loops described in the preceding paragraph, have their ends joined by flash butt welding, after which the flash is removed.

For a time, removal of the flash constituted a trying problem. Stainless steel hardens when it cools and attempts to remove the flash with carbide or high-speed steel tools or by grinding wheels were not successful on a production basis. The problem was solved through development by Fagle Tool & Die Co., Dearborn, Mich., of a hydraulically-operated flash remover, Fig. 4. Its operation is accomplished through three hydraulic cylinders—two mounted on top of the machine and one at the left side—and three sets of toggle arms.

Two-Step Carbide Cutter Utilized—The coil or loop is inserted in a slot in the dies and the wire to the left of the flash is held securely in grips actuated by the top left-hand cylinder and toggle arms. A two-step carbide cutter, with the two cutting edges offset 1/64-inch, encompass the wire immediately to the right of the flash and are held in slipping contact by means of the top right-hand cylinder and toggle arms. With actuation of the cylinder and toggle arms at the extreme left, the loop or ring is moved to the right a sufficient distance into the cutters to remove the flash by a combination of cutting and shearing action. Force required to effect flash removal is reduced greatly by the fact the two cutters are offset, thus minimizing the impact. The machine is highly satisfactory and economical and leaves the wire surface at the weld clean and bright.

All formed parts for the baskets flow to their respective areas for subassembly and welding. Subassemblies then move on for further assembly and welding. For welding, the various wire forms or assemblies are loaded directly into the welding machines or preloaded into fixtures which are transferred into the machines.

Fig. 5 shows the machine, built by Expert Welding Machine Co., Detroit, which welds together the wire components for the circular dish rack. It is a three station unit with three fixtures mounted on a roller turntable which rotates 120 degrees at each indexing. Two operators are required—one for loading and clamping the components in two of the fixtures, while the other supervises the welding operation in the third fixture and then unloads the dish rack after the turntable has indexed following welding.

Electropolishing Next Operation—After all assembly and welding operations have been completed, the baskets are cleaned of weld flash, inspected, and then hung on an overhead delivery conveyor to be transported to the electropolishing department located in another area of the plant. Arriving in this department, the baskets are unloaded from the conveyor and hung on electropolishing hangers or racks, these hangers in turn being hung on the Udylite electropolishing machine shown in Fig. 6. The polishing cycle requires 20 minutes, and the baskets, as they emerge, are removed from the racks and placed in chutes for delivery to an assembly bench, shown in the illustration, where operators attach component parts, such as rubber bumpers, front bearing, two rear bearings, screen assembly and silverware basket.

Succeeding operation is to assemble the basket into one unit with the rack carriage, cup rack and glass rack. The complete assembly then is hung on another overhead delivery conveyor which also serves as a storage conveyor. This conveyor carries the baskets to their point of use on the dishwasher final assembly line. Here the baskets are removed from the conveyor one at a time as required for installation in dishwashers coming off the assembly line.

Fig. 3—To handle forming of intricate shapes, specially designed air-operated machines, such as this unit, were built by Hotpoint engineers

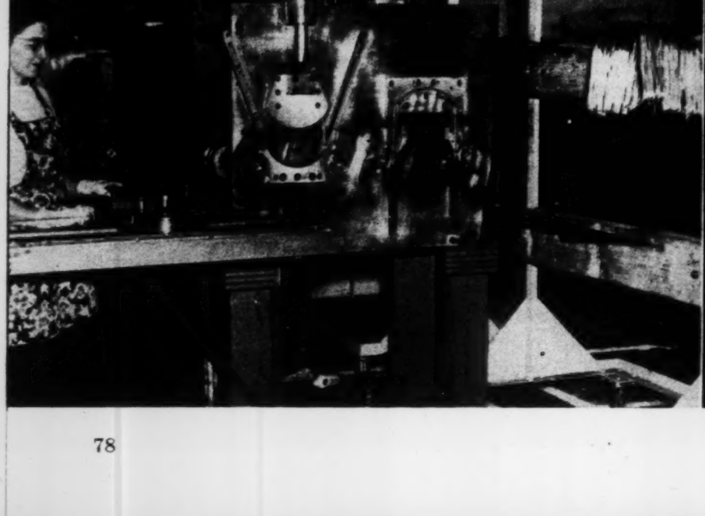
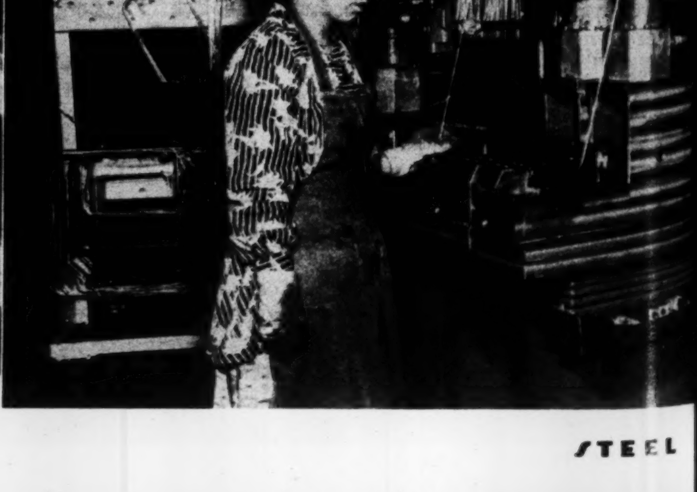


Fig. 4—Flash from butt-welded loops and rings is removed efficiently by this Fagle hydraulically operated machine



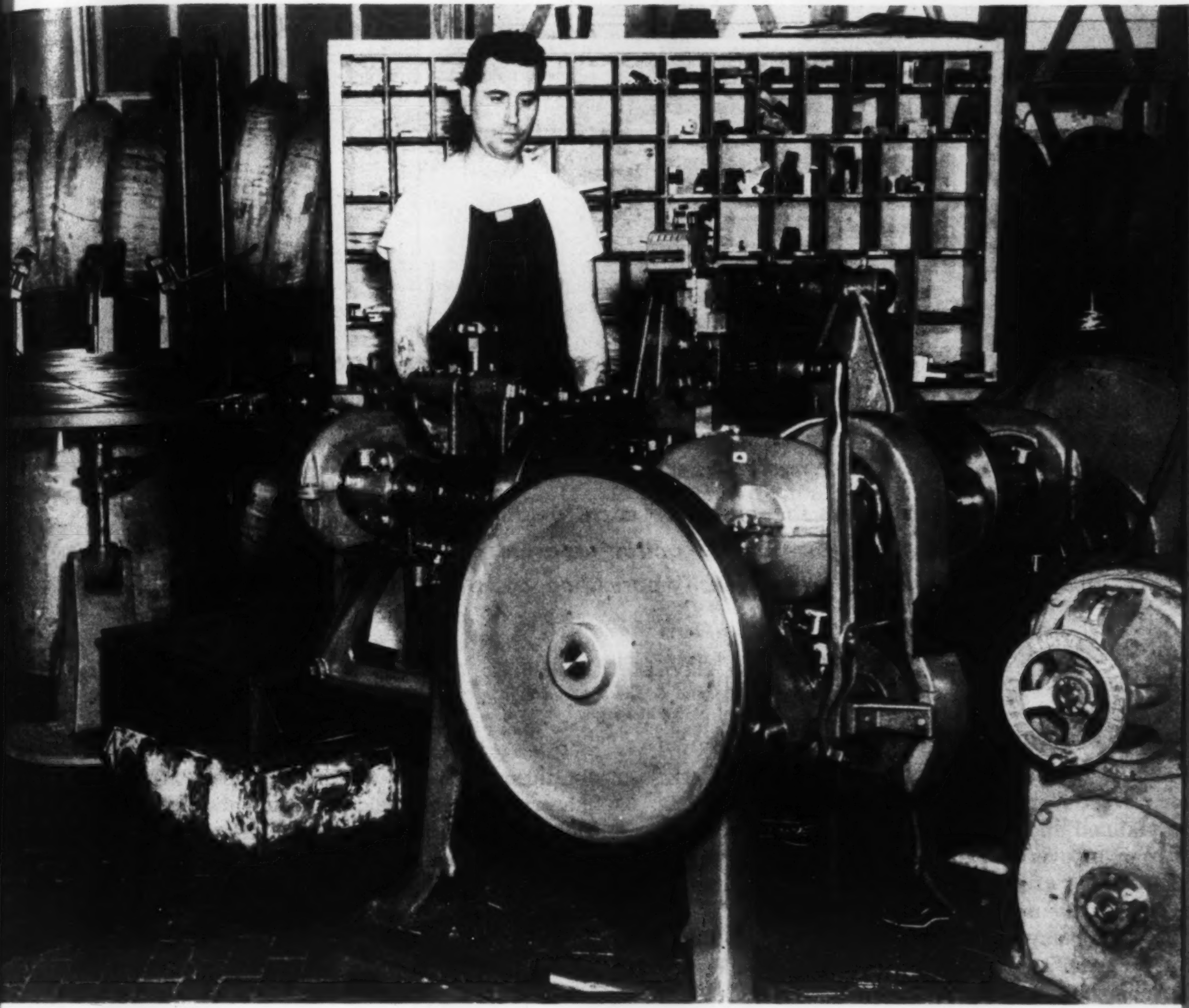


Fig. 2—This is one of several Nilson 4-slide wire forming machines in which shapes for dishwasher baskets are cut to length and formed

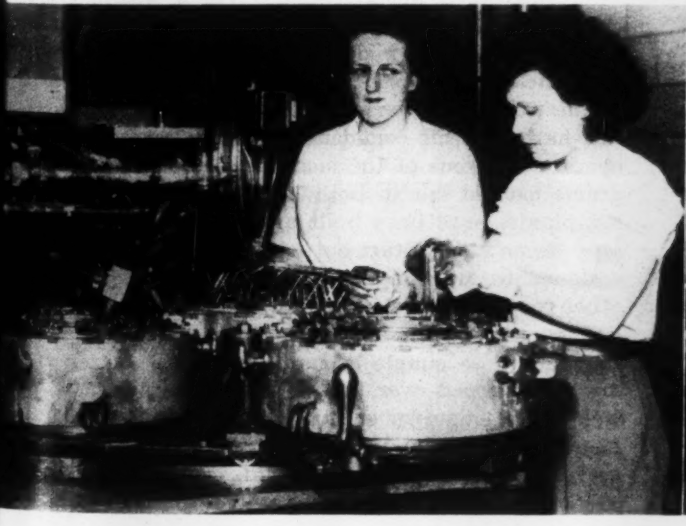
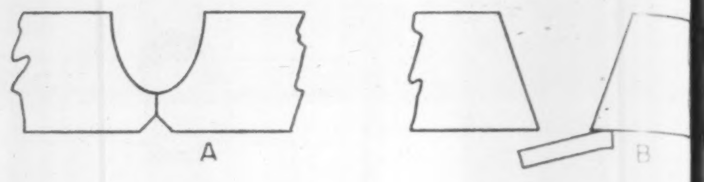


Fig. 5—Basket components are resistance-welded together in this Expert three-station automatic welder. Two stations are loading while the third is welding

Fig. 6—After baskets are electropolished in the Udylite machine shown in background, they are delivered to the assembly bench in foreground



BETTER WELDMENTS THROUGH "TAILORED" QUALITY CONTROL

Engineered to meet the needs of each welding shop or department, a well-devised, practical quality control program can pay substantial dividends in form of lower overall fabricating costs and improved products

By ORVILLE T. BARNETT
Metal & Thermit Corp.
Pittsburgh

PROPERLY devised, quality control can be a tremendous asset in making better welded fabrications. Poorly planned and executed quality control can be a costly item in overall fabricating expense. For this reason, it is of great importance to tailor-make the program to fit the needs of the shop.

If the work being done is relatively simple, a simple control program should guarantee that all welds will be of proper quality. If products are complex and expensive, step-by-step procedure will demand more complicated control safeguards. In either case, attention to detail, the establishment and maintenance of standards, knowledge of materials, electrodes and equipment, will pay substantial dividends.

Every welded structure, large or small, becomes a component and as such an important part of a finished product. The quality of the finished product is, of course, no greater than the quality of its individual parts; the quality of the basic material and, of course, the quality of the weld binding the materials into an integral unit.

Quality Begins with Design—Quality in welding work begins with the design of welded structures. There must be good liaison between the designer and the production group. It is very helpful to have the engineer check his work on the drawing board with one of the operating shop personnel so that by mutual agreement they can make sure that all welds are properly situated to permit good work. Otherwise the designer may have a perfectly good structural design but one which would require a contortionist to reach and a bronchoscope to see.

Design includes the selection of base material. Not always is that material best suited to the work from an engineering standpoint the ideal one from a welding angle. Therefore, the selection of the material to be fabricated must take into account the various limitations of the welding process. Of course any material can be welded; there are almost no exceptions to this statement, but the problem is one of selecting a material that will give good structural qualities while at the same time making the welding job as easy as possible. When the selection of a base material calls for a special welding material, preheat and postheat and meticulous attention to many details, the cost of such a job is sure to rise.

Welding Procedure—The next step should be the outlining of a detailed welding procedure. Once the procedure is completed, the shop is ready for the actual fabricating work. In order to make sure that a quality job is accomplished the supervision provided should be of proper caliber. An experienced welding engineer will be found in most large organizations while these duties devolve upon the welding foreman in smaller shops. In the very smallest shops where neither a welding engineer or a welding foreman is to be found, lead welders are used to make sure that the work is done in a proper manner.

Trained Operators—But the best welding engineer in the world is powerless to turn out good welds unless he has at his command properly trained welding operators. Some of the most successful welding programs carried out in both large and small fabricating plants, have been built around home-made welders. Some plants start out with raw recruits who are assigned to sweeping the floor or chipping or some other routine labor class of work.

They are studied as to the efficiency with which they do these simple assignments. The better men are then turned over to the welding engineer or the welding foreman for special classes in welding. These men are trained in the simple rudimentary practices essential to making a good weld. Step by step they are brought along until they know nothing but good

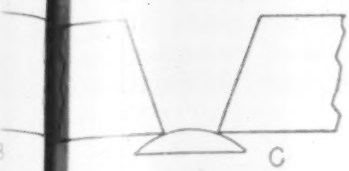


Fig. 1 — U-68 pressure vessel joint designs. (A) Head seam, (B) first design for closing seam, (C) final design for closing seam

habits of welding. When they have had sufficient experience in the training program they are assigned to day-by-day welding operations.

Usually, the beginning step is to use these men on tack welding. When they show proper proficiency in this field, they are next assigned to the simplest class of work done in the shop. As they gain greater experience and ability they are moved along to the more and more difficult jobs. Naturally welders trained in step-by-step procedures as just outlined, if of the proper type, will consistently turn out work of high caliber and quality.

Final Inspection—Regardless of the excellence of welding techniques employed in the shop by experienced and proficient operators there is still the need for final inspection. The ideal setup for any inspection division of a manufacturing plant is to have the inspection department report directly to management. Otherwise the inspectors are apt to be influenced by the manufacturing personnel for whom they work.

Since the inspector's primary objective is the maintenance of quality standards in the finished product and the prevention of shipment of inferior items, the man selected should have a solid knowledge of the product and every factor which might contribute to its failure in service. This, of course, includes the ability to check carefully any and all welding which has been applied. If, for example, the inspector deals largely with manual metal arc welding, he should have considerable experience as an actual welding operator. In addition some elementary knowledge of engineering design and metallurgy would be other excellent attributes.

The inspector's duties include interpretation of drawings and specifications, verification of procedure and welder's qualification, checking the application of approved welding procedures, selection of production test samples, interpretation of test results and preparation of records and reports. The very simplest type of structural fabrication, for example, might not require all of the tests outlined above.

Of great importance is the personality of the inspector. He should be able to get the operating personnel to co-operate with him because he uses tact and shows a good basic knowledge of his work.

Activities Co-ordinated—No good inspection setup is aimed at catching the manufacturing group in mistakes. Rather, the best type of program is one that co-ordinates inspection and production activities in order to maintain "in process" inspection. By this method errors are caught before they grow to alarming and expensive proportions.

Another function of the inspection department is the investigation and reporting of substandard work, either discovered in the shop or reported from the field, as a basis for improving procedures. The inspector can perform an extremely valuable service by using any failures that occur as a basis for a conference among management, production and inspection personnel to correct any shortcomings in procedures so as to make subsequent work of similar nature flow through the shop smoothly.

Testing Welded Structures—No discussion of quality control of welding would be complete without outlining the testing of welded structures. Such tests are for convenience grouped under four headings:

1. Visual examination
2. Internal defects
3. Physical properties
4. Test methods

By the use of organized visual examination of welded structures, the following typical troubles may be discovered: Warpage, improper joint preparation, incomplete chipping, weld size, bead contour, reaction pits, cracks and undercuts.

Internal defects are, of course, more difficult to uncover, yet means should be established for locating porosity, slag, incomplete penetration, and surface cracks. More often than not such internal weaknesses result in ultimate breakdown under fatigue or exposure to sudden and unexpected stresses.

Physical property tests are sometimes advisable with studies determining the maintenance of the tensile strength of the base material, its ductility, hardness and other service factors which are known to be required of the finished item. The manufacturer should be thoroughly familiar with the requirements of the finished unit as demanded by the customer and should be prepared to make use of the many test methods available for various properties required.

Microscopic Examination—Although rather infrequently employed, microscopic examination may lead to the discovery of unsatisfactory heat treated products in the heat affected zone of the weld as, for example, the martensite to be discussed in the case history of a 3½ per cent nickel weldment that failed. Fracture tests are often chosen to show the soundness of the weld metal in fillet welds. A standard nick-break test has been used for years in API-ASME pressure vessel test plate examinations. Likewise there are a number of types of tensile tests that have been developd to disclose the properties under consideration. These tensile test designs include full section, reduced section, transverse, all-weld metal and base metal tests.

No one should overlook the fact that too much testing is within the realm of possibility. For this reason it is well to realize that a comprehensive inspection program should never be used as a crutch.

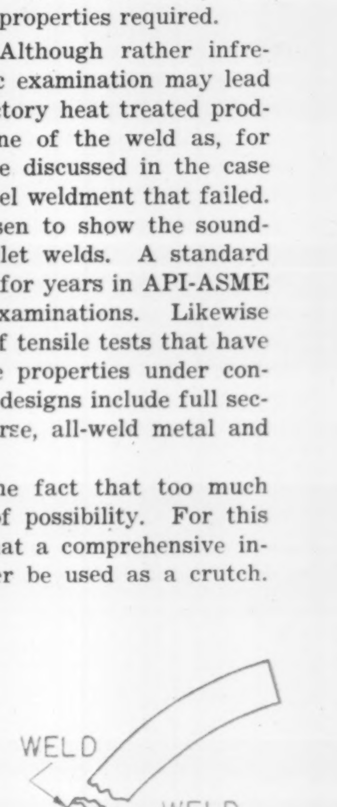


Fig. 2 — Bend specimens from 3½-per cent nickel steel weldment. (Left) Bend test specimen that failed, (right) specimen from same plate after normalizing

If such conditions prevail, the production group learns to rely more and more on the inspection organization to catch production shortcomings. When there is no real incentive to do proper work in the first place, no complicated series of expensive tests will prove worthwhile.

Some Problems—A few examples of actual problems encountered and solved and which could have been prevented originally by proper step-by-step planning, will reveal the value of an organized program.

First, consider the case of a closing seam on a small diameter heavy U-68 pressure vessel. This structure was designed in complete accordance with the ASME Unfired Pressure Vessel Code. In order to qualify for the U-68 classification, it was necessary that all seams be examined by radiography.

No problems were encountered in welding the head seam on this pressure vessel because the welder had enough room in which to weld the back-up side. Chipping was done from the outside and the weld was completed from the outside. X-ray examination showed that the weld was sound.

Backing Strip Used—Because there was no manway opening in the vessel it was necessary to weld the closing head seam from the outside only. Immediately this problem was felt to be resolved by using a plain backing strip. However, the problems of securing good fit between the main shell section and the head used for closing, were extremely difficult. First, x-ray pictures showed that incomplete penetration had been obtained because in many places there was no joining of the root of the weld to the backing strip. In fact, the pictures merely showed that the large space between the backing strip and the side wall on the head side were preventing the welders from doing a satisfactory job.

Once the defective work was discovered, a hurried conference was held between the design and fabricating groups. As a result of this investigation a half-round was used for backing up the closing seam as shown in Fig. 1. This type of section permitted good fit-up all the way around. Besides, a special jig was constructed to jack the backing strip into close proximity with the root of the joint on both sides of the groove. After this discussion which, of course, should have been held prior to beginning the work, and subsequent careful attention on the part of the fabricating group, it was possible to produce many vessels with no x-ray deficiencies.

Interpass Temperature Not Maintained—Another interesting case involved the welding of 3½ per cent nickel steel in pressure vessels designated for low temperature service. Here a good preliminary investigation was carried out by the welding engineering group in co-operation with the design engineers. Test plates showed that the material could be readily welded by the procedure outlined.

In this case the fabricators of the vessel failed to follow the program planned as a result of the test plates. Somewhere along the line the production group failed to maintain the interpass temperature outlined in the welding procedure. This error was not discovered until the test plate attached to the longitudinal seam of the vessel was being tested. Under test the free bend specimen broke in two before a satisfactory angle of bend had been attained. Obviously something was wrong.

Microscopic investigation of this failure disclosed that the interpass temperature had dropped because a martensitic structure was being created in the heat affected zone. A conference between the outside inspector and the fabricator's welding engineer showed that complete physical properties could be restored to the welded section by the use of normalizing.

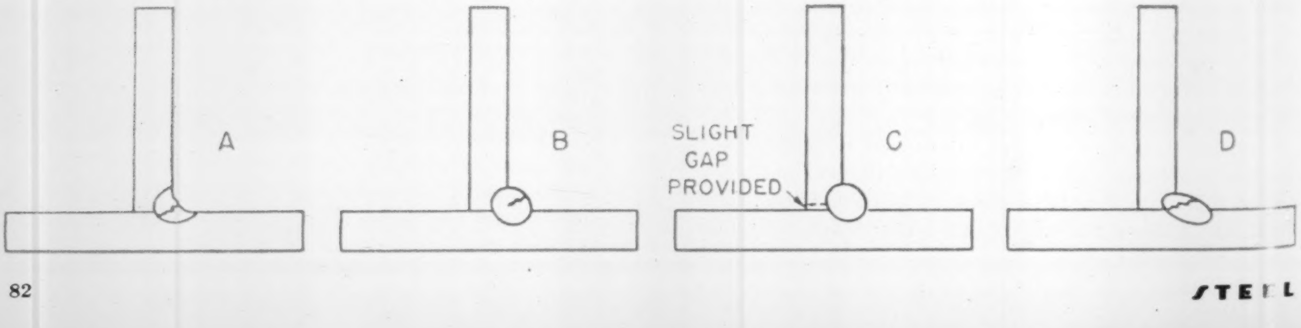
Accordingly, the vessel was heat treated along with one of the discard portions of the test plate. Following the heat treatment, a small sample was cut from the weld showing that a good pearlitic structure had been obtained. Next the discard portion of the test plate was machined into a free-bend specimen and, under test, exhibited acceptable ductility as shown in Fig. 2.

Cracked Fillet Welds—Not only during the heightened shipbuilding activity of World War II, but also in the more limited shipbuilding work being done now, an occasional epidemic of cracked fillet welds is encountered. Frequently these cracked welds are discovered in combination with the use of E-6020 "hot rods". Usually an epidemic of this sort is immediately blamed on the electrodes, no matter how good the reputation of the electrode manufacturer.

Many thousands of such cracked welds have been examined over a long period of time and almost invariably the outstanding defect is one of shallow throats on fillet welds. These welds are made at speeds in excess of acceptable limits and insufficient weld metal exists in the throat of the fillet to withstand normal shrinkage stresses. For this reason the weld cracks.

Another contributing factor may be tight fits sometimes found, as in Fig. 3. Here there is no possibility for the parts to come together during shrinkage to relieve some of the stresses built up. A somewhat less frequent cause of cracked fillet welds in this type of fabrication is insufficient weld metal on the upper leg of a horizontal fillet.

Fig. 3—Cracks found in E6020 horizontal fillet welds. (A) Shallow throat crack, (B) tight fit crack, (C) sound weld, (D) insufficient metal on upper leg



SEEN AND HEARD IN THE *Machinery Field*

By GUY HUBBARD

Machine Tool Editor

WHAT ARE WE WAITING FOR? Throughout the spring meeting of National Machine Tool Builders' Association in Chicago, I was conscious of determined efforts to overcome obstacles to modernization.

When national economy and security dictate that sweeping replacement programs be put into effect, a peculiar combination of national legislation, managerial uncertainty and "fear-of-the-machine" conspires to block installation of improved equipment which would increase government revenue, pay big returns on invested capital and make more and better jobs for more people.

According to Lloyd D. McDonald, vice president, Warner & Swasey Co., one thing we are waiting for is repeal or modification of Section 102, Internal Revenue Act, under which government agents now say to those who have saved up money to buy new equipment: "That's your story. We know better. You're a tax dodger!"

According to L. W. Scott Alter, president, American Tool Works Co., many executives of metalworking plants have not yet awakened to the fact that while financially solvent their companies rapidly are approaching "mechanical bankruptcy". The association is busy arousing management to that danger.

According to David Ayr, president, National Machine Tool Builders' Association, it is high time that Philip Murray of CIO quit repeating: "Organized labor is not going to sit idly by and permit widespread introduction of machinery to starve workers to death." Tell Berna has offered to debate that question. No union official has met his challenge.

FOUNDRIES AND MACHINE TOOLS: Importance of foundries—gray iron foundries in particular—to the machine tool industry is indicated by the number of interesting visitors I had during the Foundry Show.

Some of these welcome visitors were from "captive foundries", of which the machine tool industry has many. Others were experienced foundrymen who now are employed by machine tool builders to see to it that beds, frames, columns, slides and other important details are designed so as to be "economically castable". I find that an increasing number of such specialists are attached to machine tool engineering departments.

It is my conviction that no group of machinery manufacturers today is more progressive in foundry practice than the machine tool builders. By the same token, I am convinced that no finer heavy castings are made today than those which go into the building of machine tools. This is true not only metallurgically but also in the fine craftsmanship which goes into the production of these castings. This involves the most intricate core work and molding to insure freedom from blemishes on large areas of unmachined surfaces, as well as freedom from the most minute blow holes over large areas of precision machined surfaces.

Although tonnages involved in machine tool production are relatively high, quantities of individual castings are small as compared with the automotive industry for example. Nevertheless, the degree of mechanization of many of the latest machine tool foundries is high and the cleanliness of these foundries is remarkable. These foundries are setting standards which—in the interests of high quality and reasonable costs of castings, and decent working conditions—should be aimed at by the entire industry.

INGENUITY AT DELCO-REMY: Outstanding among the plant visits which I recently have made, was that to Delco-Remy division, General Motors Corp., Anderson, Ind., May 7-8, 1950. My mission was to give a talk to foremen and supervisors on impact of new machine shop practice on machine tool design. As often happens in such cases, I learned more from my audience than my audience learned from me.

In my tour of the various plants under guidance of Dave Birch of the Process Department—which department is concerned with constant improvement of manufacturing and assembly operations in the interests of economy, better products and better working conditions—I saw many things which strengthen my faith in the American system of manufacturing and in the ingenuity of American production engineers, tool engineers and machine operators. Many things that they are actually doing today foreshadow the design of metalworking machines of tomorrow.

Delco-Remy is concerned with production of a profusion of electrical details which enter into design of General Motors' vehicles—everything from starters to horns being involved. This equipment constantly grows more complicated from an electrical point of view. It is the job of the Process Department to keep down its cost through saving material, speeding up machining and gaging and improvement and mechanization of assembly operations. A valuable byproduct of all this is that the quality of the products constantly is improved and rejects reduced.

Many attempts have been made to define tool engineering. To my way of thinking, the work being done by the large staff in the Delco-Remy Process Department is a living demonstration of tool engineering—even though I still can't define it. The main implication of it all is that in the American system of mass production, eventually no man or woman worker will be expected to perform any operation which a mechanical device can be made to perform.

A surprising thing about all this is that better jobs constantly are found for the displaced workers and the workers themselves almost immediately become unwilling to revert to the "unmechanized" ways of doing things. No power plant worker today would go back to stoking a boiler with a scoop shovel; no automobilists would perform the chores involved in operating a horse and buggy; no Delco-Remy worker would swap his automatic for a foot-power lathe.

HOW TO SPECIFY COPPER ALLOYS

"WITH few classes of metals it is so important for the purchaser to accompany his specifications with full particulars on the forming and fabricating methods to be used, the nature and length of service to be expected of parts, and the details of part design", cautioned James T. Duffy Jr., president of Riverside Metal Co., Riverside, N. J., in a bulletin recently issued to the metalworking industries. Purpose of the analysis was to improve purchase-order habits in the buying of high quality copper alloys—nickel silver (both leaded and lead-free), cupro-nickel, phosphor bronze and beryllium copper.

Mr. Duffy and his metallurgists pointed out that there was no "best" or "standardized series" of copper alloys which meets most requirements for most applications. Each user of nickel silvers and phosphor bronzes should work out with the metal producers that particular combination of constituents, heat treatments, reductions, and tolerances which best suit his applications. There is such great latitude in the resultant properties (physical, elastic, chemical and electrical) that small manipulations of composition and processing procedure often make large improvements of ultimate part service.

Temper Important—Not the least of the specifications on nonferrous rod, wire, strip and sheet which few buyers really understand, is that of temper. Many difficulties referred to Riverside metallurgists proved to be easily solved by a slight readjustment of the customer's temper specification.

Temper affects formability, fatigue strength, ductility, tensile strength and many other working factors. Often it is indicated by per cent reduction in cross-sectional area by cold working.

Rolled or drawn tempers are specified by either the descriptive designations in the first column of the accompanying table, or by the B&S number system in the second column. This number system is so designed that annealed stock of a given Brown & Sharpe gage is brought to the desired temper (¼-hard to extra-spring) by cold rolling to a Brown & Sharpe gage thinner than the original stock by the indicated number (1 to 10) of B&S gage designations. Annealed temper is either specified as merely "soft"—or, more precisely, by nominal grain size.

Mr. Duffy explained that buyers frequently specify too hard a temper, as against too soft a temper. Broken tools and dies, high rates of rejection of formed parts due to surface and corner cracks, and field reports suggesting inadequate service life of copper alloy parts—all indicate a careful review of temper specifications, with an eye to using softer stock.

Dimensional Tolerances—Much also could be said about dimensional tolerances. The most neglected detail in this regard, however, is the question of which tolerance specifications are standard with the producer and which are special, and thus higher priced. Tables of standard commercial tolerances are published by each producer, as well as by the Copper and Brass Research Association — and gladly supplied on request. Both designers and purchasing agents should have them at hand. It is always wiser to specify dimensions in decimals (which cannot be confused and which require no reference to gage tables) rather than by gage number.

Especially with nickel-silver, phosphor-bronze and beryllium-copper does the use of the metal influence its specification. And more often than not the producer, rather than the buyer, is in a position to know best which alloys and tempers will best handle the situation, the Riverside official asserted.

Simplest way for a buyer of copper alloy to detail the fabrication and end-use, so helpful in cinching the right alloy and temper selection on the first try, is to submit with the inquiry an actual sample of the part to be made from the material—or, at least, a blueprint or sketch. If the application is a new one, it is helpful to describe the overall nature of the equipment, product, mechanism or device in which the part is to be used. If the application is an old one, the materials previously used (and the experience had with them) should be described.

And finally, among the service requirements which buyers should be sure to report when such requirements exist are: Special corrosion requirements, cycles of operation, wear, and impact. Often special acceptance tests are used by the buyer — and should be explained to the supplier. In many cases it is wise to keep an eye on matters of grain direction, fatigue limits, and finish.

To help engineers, designers, metallurgists and purchasing agents cover all important matters when inquiring about nickel-silvers, cupro-nickels, phosphor-bronzes and beryllium-copper, Riverside devised a single-sheet check-list which, if properly filled out, should give suppliers the information necessary to intelligent recommendation.

	STRIP		WIRE	
Temper	B&S Numbers hard	% Reduction in Thickness	B&S Numbers hard	% Reduction in Area
¼ hard	1	10.95	⅛	10.9
½ hard	2	20.7	1	20.7
¾ hard	3	29.4	2	37.1
hard	4*	37.1	3	50.0
extra hard	6	50.15	4	60.5
spring	8	60.5	6	75.0
extra spring	10	68.65	8	84.4

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* Note for convenience in remembering: "Hard" is 4 B&S numbers hard, ¼, ½ and ¾ hard are B&S numbers 1, 2 and 3 (corresponding to the numerators of the fractions).

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SERVICE whereby specialists make a complete and thorough study of operations to determine where, how and why brushes can be applied to an advantage is being re-established by Osborn Mfg. Co., Cleveland. Once the service, discontinued during the war, is requested specialists visit the plants and provide a written confidential report covering every operation using brushes, with recommendations on how savings might be made, operations where brushes are not used, where brushing would increase production or improve the product and operations where brushes are used where another method would prove more advantageous are noted in the report.

Said to be typical are reports showing how a road equipment builder speeded up weld cleaning operations 40 per cent, how a shipbuilding company reduced metal cleaning costs by one half and how a wire company removed enamel from armature ten times faster.

Aircraft Electrical Manual

ELECTRICAL system installations for transport aircraft are described in a design guide announced by Aircraft Industries Association of America Inc., Washington 5, D. C. Although basically prepared for transport category aircraft, most of its features are equally applicable to military aircraft and other types of commercial planes.

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Production Of
MALLEABLE CASTINGS

Although malleable iron originated in Europe as a decarburized material, the quality of which depended upon the extent of the carbon removal, its effective development has been in the United States

By JAMES H. LANSING
Technical and Research Director
Malleable Founder's Society
Cleveland

PART I

CENTURIES ago, when iron ore was first sufficiently heated to enable the iron to absorb a substantial amount of carbon from the charred wood, the melting point of the metal was thereby lowered, it became liquid, and, assuming the form of the material on which it solidified, became the first iron casting.

Centuries later, in 1722, Reaumur, a French scientist and metallurgist, somewhat reversed the procedure by heating small castings, packed in iron ore, at a bright redness for a number of days. The ore surrounding the castings, being eager for carbon at the elevated temperature, decarburized the castings, thereby producing the first malleable iron. The fact that the castings were small, made certain that all of the carbon was originally in the combined form, therefore making them much tougher, following decarburization, than would have been the case, had carbon in the free or flake form, as in large castings, been present and subsequently removed. Accordingly, effective production of European white-heart malleable, so-called because of its light colored fracture, was limited to very light sectioned castings.

Standard American malleable iron was first produced a century later. In 1826, Seth Boyden, an inventor and foundryman, was trying to make white-heart malleable in his small foundry at Newark, N. J. He was at first disappointed to note that his annealed product had a dark gray or black fracture, rather than the "white-heart" for which he was striving, but soon came to realize that his "black-heart" malleable possessed greater toughness and ductility than the European product. Unwittingly, he had produced a new material, American malleable iron.

The basic reason for Boyden's accomplishment was, that in making the hard iron castings which subsequently were malleableized, he had used pig iron of higher silicon and manganese content, but lower sulphur content, than was generally available in Europe. The castings were also low enough in carbon content that all of the carbon was originally in the combined form, therefore no weakening primary graphite was present.

With sufficient amount of manganese to offset stabilizing effect of sulphur, and sufficient silicon to promote graphitization of the combined carbon (iron carbide) at sustained elevated temperatures, a heat-conversion process took place, in which the carbon separated out of the hard carbides into nodules of free temper carbon embedded in ferrite or carbonless iron. This produced a tough and ductile but easily machined material, which was malleable iron in practically the same form that we know it today.

Thus, although malleable iron originated in Europe as a decarburized material, the quality of which depended upon the extent of the carbon removal, its effective development has been in the United States as a material which owes its toughness and ease of ma-

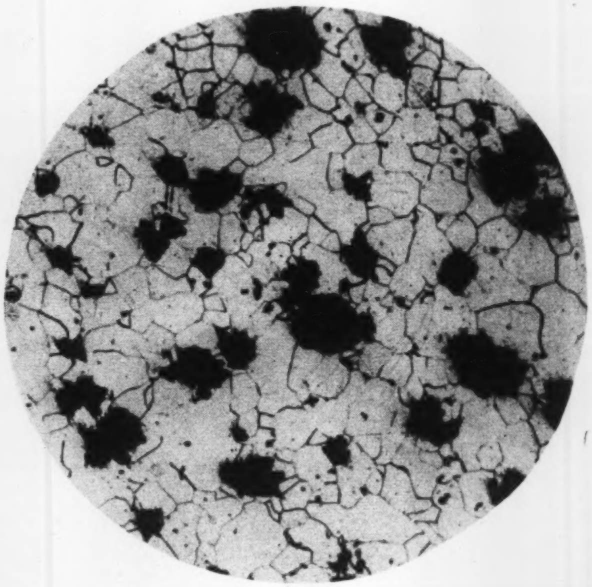

Fig. 1—Temper carbon nodules distributed throughout a ferritic matrix

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chining to the fact that the original combined carbon has all been converted into temper carbon nodules, distributed throughout a ferritic matrix. (See Fig. 1 showing uniform structure)

In *American Malleable Iron—A Handbook,* prepared by a group of which the present writer was a member, malleable iron was defined as, "An alloy consisting principally of iron and carbon, which, as cast, is extremely hard and brittle, but is rendered tough and ductile by a subsequent heat-conversion process." Its unique combination of properties, establish it as an ideal material for a wide diversity of applications. These properties include: Toughness; excellent resistance to heavy and repeated impact; excellent ductility; good resistance to corrosion; easy machinability; and a versatile castability that makes possible sound castings, accurate to pattern, in complicated as well as simple forms, over an extensive range of weights and sizes. The high fluidity of the metal, as poured, makes for sound homogeneous castings having relatively thin-walled sections, not producible in any other ferrous metal of strength and toughness comparable to annealed malleable.

Malleable iron castings serve so dependably and effectively that, although universally used and well known to large manufacturers, they seldom come to the attention of their ultimate users. Most people do not know that their automobile's steering gear, on which they are so dependent, relies on its malleable iron housing to withstand all road shocks and impact. (See Fig. 2) In normal times, over a half-million tons of malleable iron castings are used annually in the automotive industry. Differential cases, carriers, bearing caps, steering gear housings, brake and clutch pedals, pedal brackets, brake supports, hubs, steering post brackets, truck rear axle housings and comparable diverse parts are made of malleable.

In agricultural implement manufacture, mower and reaper knife guards and shoes, draft brackets, housings, binder needles, yokes, detachable drive chain and other castings, are made of malleable. The material's excellent corrosion resistance recommends it for this service in which the machines are exposed to the weather, in many cases at all times, and contribute to its increased use in tractor, bulldozer and similar farm, road, and construction machinery. Railroads use malleable brake heads and fulcrums, box car door hangers, hand brake wheels and housings, tank car dome rings and fittings. In the electrical transmisson field, an outstanding malleable application is the insulator cap used in high voltage lines. Here also the basic corrosion resistance of malleable and the facility with which it takes an excellent hot dip galvanized coating, influences its specification.

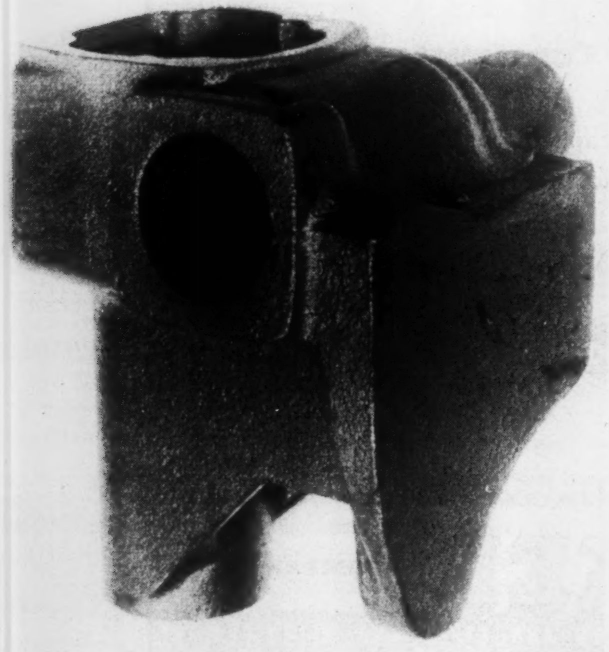


Fig. 2—Malleable automotive steering gear housing

James Haswell Lansing graduated from Williams College, doing post graduate work both at the University of Toulouse, and under the direction of Enrique Touceda, Professor of Metallurgy at Rensselaer Polytechnic Institute.

He entered the employ of the Eastern Malleable Iron Co., working through the various departments as core maker, molder, melter, etc., during his first years at the company's Troy, N. Y. plant. Subsequently he became metallurgist at the Wilmington works of the company and for a period of 12 years, was associated with other malleable industry plants in the capacity of superintendent, works manager and general manager.

In 1936 he joined the Malleable Founders' Society as shop practice engineer, succeeding the late Enrique Touceda as consulting engineer in 1943. As he directs all of the society's research and technical activities, his title has been changed to technical and research director.

He has written technical articles for the ASME, the SAE, the AIME, the Western Society of Engineers, and the Cleveland Engineering Society. He served as chairman of a group on the malleable section of the AFA *Cast Metals Handbook,* also collaborated with Malleable Founders' Society's committees in the preparation of *American Malleable Iron—A Handbook,* and "This Moving World," a technicolor sound motion picture.

Mr. Lansing is a member of AIME, ASME, ASTM, and AFS, serving as secretary of Committee A-7 of ASTM.

How are present day malleable iron castings produced? As was earlier indicated, the original castings must have all of their carbon in the combined form, that is be "white iron" castings, so called because of their fracture, rather than "gray iron" castings which contain considerable carbon in the graphitic flake form. The annealing of castings originally containing flake graphite would produce a decidedly inferior material, planes of weakness being caused by the flakes. Accordingly cupola melting alone is not satisfactory for the production of the white iron castings which are subsequently to be converted into

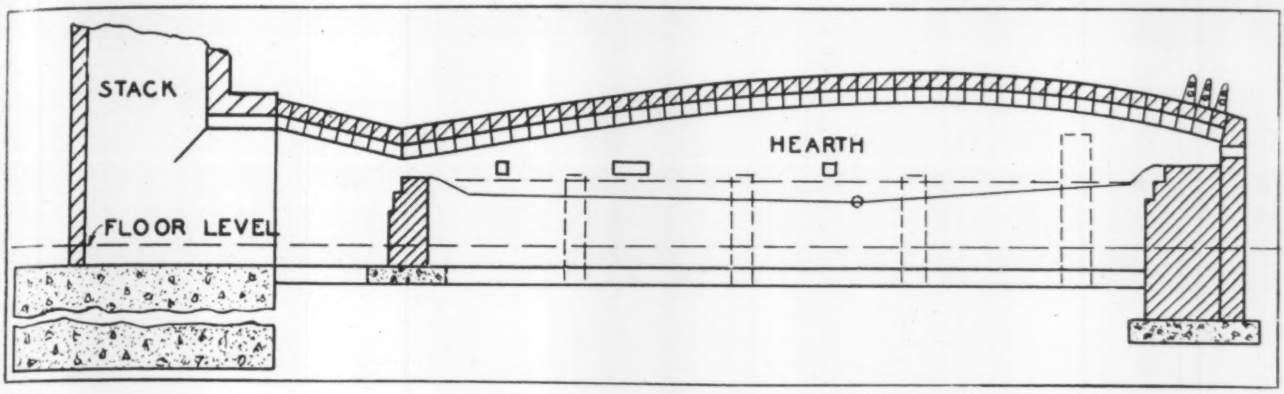


Fig. 3—Sectional view of a typical air furnace

standard malleable iron. This is due to the fact first, that in the cupola the metal is in direct contact with coke which is used as fuel. Hence the iron absorbs so much carbon that, when cast in medium normal malleable sections and especially the heavier sections, some of the carbon will separate out in graphitic flakes as the castings solidify in the molds, resulting in a weaker product. Another disadvantage of direct cupola melting is a considerable chemical composition variation as the metal, from numerous small charges, issues from the cupola spout.

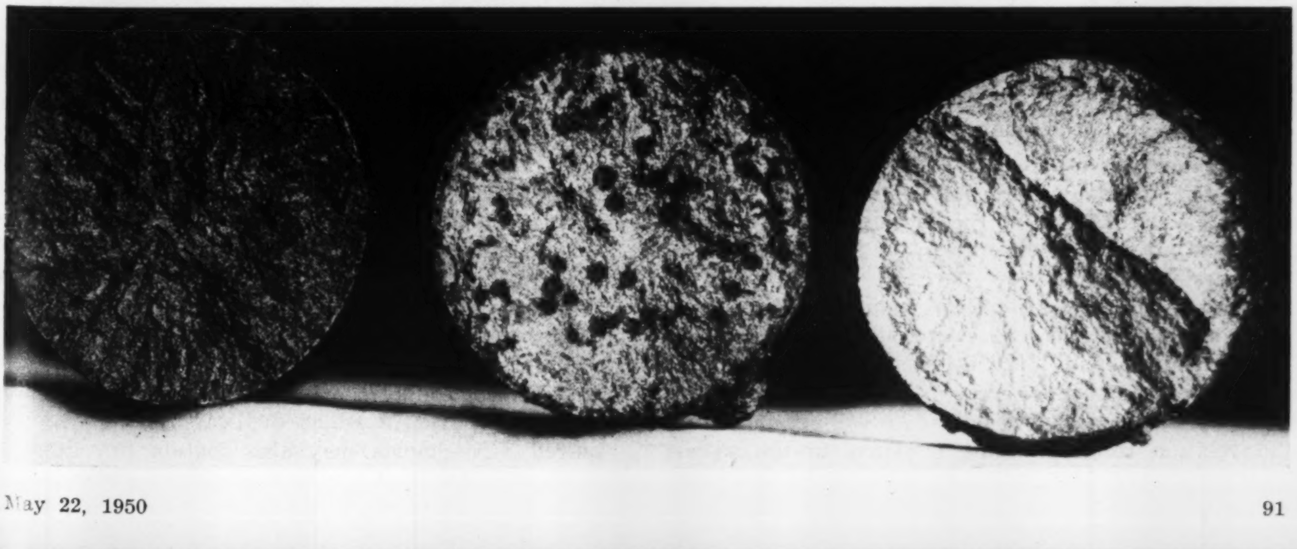
It is true that, for light sectioned pipe fittings, where the high strength, toughness and ductility as standard malleable possesses may not be necessary, cupola malleable castings, produced to considerably lower specification values, serve very satisfactorily.

To ensure high strength, toughness and ductility in both light and heavier sections, malleable foundrymen have long employed air furnaces of the acid-hearth reverberatory-type for melting. (See Fig. 3) In these furnaces, an average charge of some 20 tons, consisting of pig iron, malleable and/or steel scrap, and sprue (remelt) is piled to a height of approximately 3 feet on a hearth approximately 7 x 20 feet. Furnace walls are of neutral firebrick, supported and enclosed by cast iron or steel plates. The bottom is either of silica sand or firebrick and the top is a series of removable firebrick arches, called "bungs". The brick in the rather flatly arched bungs are held in place by adjustable metal frames and reflect heat down upon the charge, hence the "reverberatory" name of the furnace.

The charge is usually melted by pulverized coal, fired at one end of the furnace, with the flame passing over the hearth to a stack at the opposite end. As the charge becomes molten, it settles down on the hearth to a final depth of some 10 inches at the tap-out, or spout, location, the depth being less at the front and rear of the furnace. The metal is retained on the hearth by a steep slope of the bottom at the furnace's burner end and a "bridge" wall at the stack end.

As substantial feeders are used, when pouring the castings which later are to become malleable, approximately 50 per cent of the metal goes into gates, feeders and runners, referred to collectively as "sprue." This sprue or remelt, therefore, constitutes about 50 per cent of the next air furnace charge, the balance being some 35 per cent pig iron and 15 per cent malleable, or steel, scrap. A typical chemical composition of the charge in percentages may be silicon 1.40, manganese 0.50, sulphur 0.055, phosphorus 0.15 and carbon 2.80. With approximately normal melting oxidation loss, the molten metal cast from such a charge may contain the following percentages: 1.10 silicon, 0.30 manganese, 0.075 sulphur, 0.15 phosphorus and 2.30 carbon.

Fig. 4—Test sprues. One at left taken when the metal becomes molten, shows a gray fracture. Center sprue, slightly mottled indicates that the heat is nearly ready. Sprue at right with clear white fracture shows that the heat is ready to pour



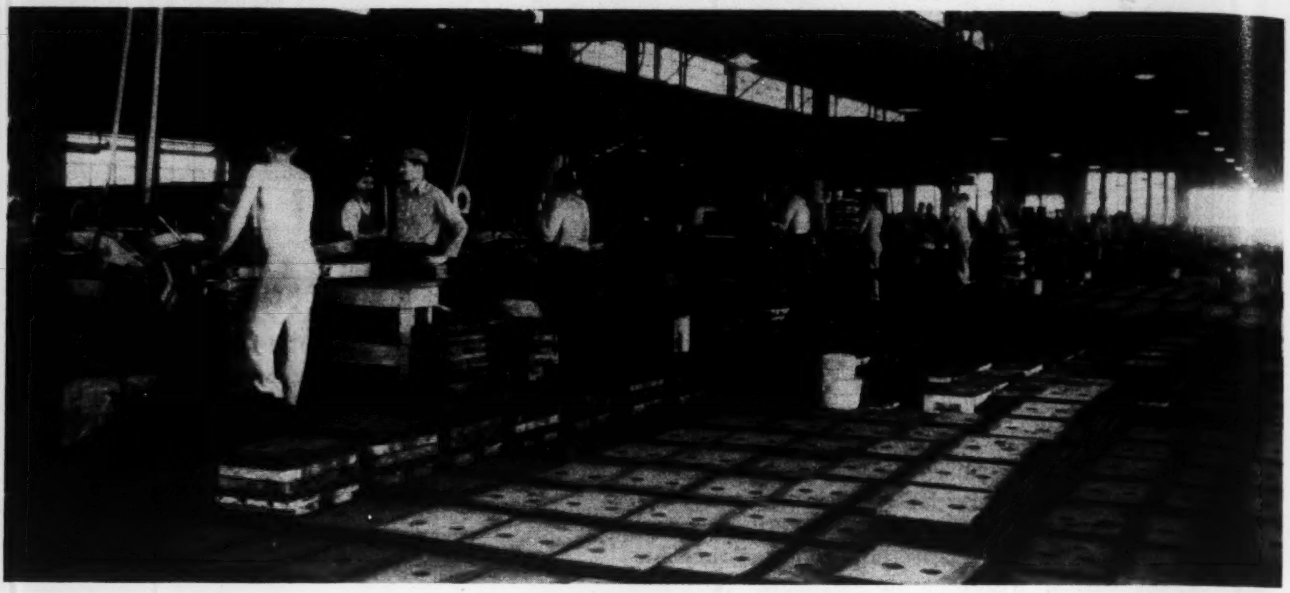


Fig. 5—Foundry floor shown here is filled with molds prior to pouring

Chemical composition values are given here, and elsewhere, only to make for a better understanding of the process. Malleable is specified on the basis of mechanical test results, not on the basis of chemical analysis, for very excellent reasons. Mechanical tests results are definite and positive and assure the user of the properties in which he is interested. Chemical values, on the other hand, may range quite widely in malleable iron but, most important, must be properly adjusted in relationship to each other. Silicon content may be 1.00 or 1.30 per cent or, in some cases, lower or higher than these values, manganese may be as low as 0.25 per cent, with a very low sulphur, or as high as 0.50 per cent with a very high sulphur, sulphur may be 0.06 or 0.16 per cent provided that the manganese content is properly adjusted for it. Phosphorus may be as low as 0.08 per cent or approach 0.18 per cent, there again being an advantage in regulating it in inverse ratio to the silicon content. Carbon may range from down to nearly 2.00 per cent to a high of approximately 2.65 per cent in the original white iron but again should be considered rather in inverse ratio to the silicon content and inverse ratio to the mechanical specification values that are desired.

Also indicative that a chemical specification would be misleading, is the fact that, although the carbon content of the castings prior to malleableizing is always carefully determined, carbon content of the final malleable product is seldom obtained. This is due to the fact that the final value is relatively unimportant, the original value being the important one, as the final value may range from 0.25 to 0.75 per cent less than the original. Here the controlling factors are the section thickness of the castings and the extent of decarburization incidental to the annealing or heat conversion process.

Also of prime importance in connection with chemical composition, is the temperature of the metal, when poured, and its graphitizing tendency. Such factors as the original graphite content of the charge and the thermal history of the "heat" are important in relation to graphitizing tendency in the as-cast white iron. Here again we see the fallacy of trying to establish chemical specification. Malleable foundrymen determine the graphitizing tendency of the metal by pouring test sprues when the heat is melted, making certain that the final sprue, taken prior to tapping the heat, be clear, that is contain no visible spots of primary graphite. (See Fig. 4) When the first sprue is poured, a sample is also taken for preliminary chemical analysis, so that ferroalloys may be added, if required, or further oxidation of carbon effected, if necessary. The foundryman thus knows the analysis of his metal and has assurance that in the castings, harmful primary graphite will not be formed, prior to tapping the heat. Melting of a typical 20-ton heat generally requires about 5 hours.

Not all iron for malleable casting production is melted directly in the air furnace. Especially in plants where all-day pouring of molds on continuous conveyors, is required, duplex melting is employed. Here the metal is originally melted in a cupola which continually feeds iron into an air furnace. The air furnace acts as a heating, mixing and refining medium, also one in which the chemical composition may be adjusted as required. At least one large company uses an electric furnace, rather than an air-furnace, as the second unit of its duplex-melting system. Duplexed metal does not substantially differ from direct air furnace melted metal. It generally is somewhat higher in sulphur content, due to sulphur picked up from direct contact with coke in the cupola. The usual practice is, subsequently, to partially desulphurize the metal by the use of soda ash in a forehearth located between the cupola and the air furnace. In any event, the higher sulphur content is not harmful as its effect is offset by using a higher manganese content in the metal.

Metal is cast in green (unbaked) sand molds (See Fig. 5), containing the imprints of the various production patterns of which duplicate castings are required. The molds may also contain dry sand or

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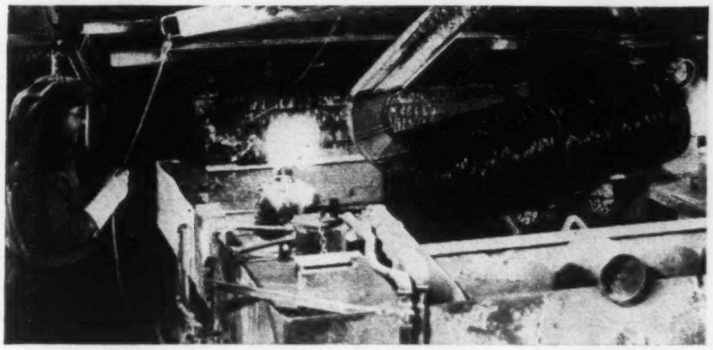

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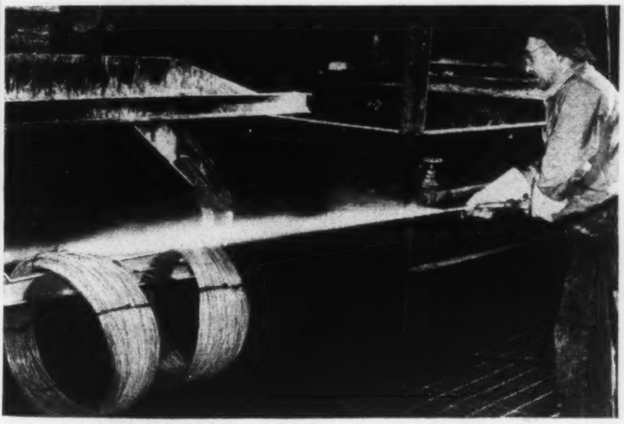

High pressure rinse completes the scale removal job.

Because the bath action stops when the scale has been penetrated down to the base metal, Audubon finds that its precision drawn wire can be descaled at the various sizes during processing without metal loss. This speedy cleaning method (work is in the bath only 15 to 20 minutes) has permitted cleaning time to be cut substantially. And; to speed production further, different metals can be handled simultaneously!

The bath is operated at 700° F. in a carbon steel tank, intermittently or continuously as the work demands. The compactness of the equipment, including the quench and rinse areas, permits a large volume of work to be handled in a relatively small space.

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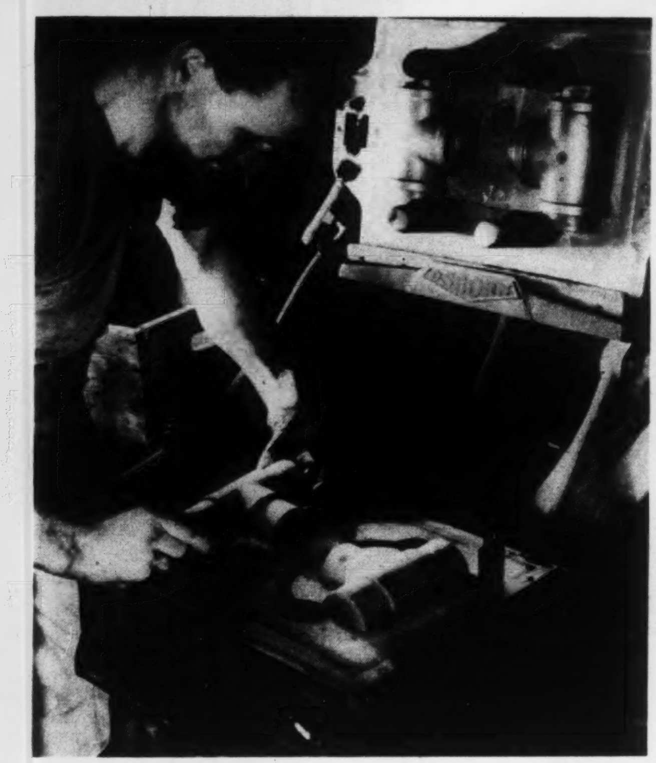

Fig. 6—Match plate pattern, lower half (drag) of mold made from it, with molder setting core

baked cores, to form such openings as cannot be formed by the imprint of the pattern or to form the casting interior. Also included are the necessary runner channels and gate voids as well as feeder voids, which, when filled by molten metal from the runners, provide reservoirs to feed additional metal into the casting as it solidifies, assuring its complete soundness.

Sand used in malleable molding must have sufficient clay bond for the mold to hold its shape when the sand contains about 5 per cent of moisture, must be sufficiently permeable to provide for the exit of gases as the metal is poured, and possess adequate refractoriness to prevent the sand from fusing to the casting.

Although the sand may be packed into a box-shaped flask, in which the mold is made, by the use of hand rammers, hand ramming is only used for the production of short orders from loose or gated patterns. Typical small or medium casting production is from match-plate patterns (See Fig. 6) on jolt-squeeze machines which both jolt the sand into the flask and subsequently squeeze it. The flasks are of wood or metal and are composed of two halves with pins and guides at each end to permit removal of the "cope" or upper half, withdrawal of the pattern from the "drag" or lower mold-half, and replacement of the cope. They may be of the "snap" flask type which has a hinge at one corner and a latch at the opposite one to permit removal of the flask from the mold, which then rests on its bottom board. An alternate type is the "slip" flask which has sliding sand-strips at the base of the cope, and sufficient taper to allow slipping of the flask from the mold when the sand strips are disengaged.

Medium and large molds are generally made on cope and drag machines, the cope being made on a jolt-strip or jolt squeeze strip or pin-lift machine in which the pattern is lowered from the cope, or the cope lifted by four pins, after the sand has been jolted and packed into place. The drag may be similarly made, or may be produced on a jolt-rollover machine which is hinged to allow mechanical rolling-over of the mold and pattern, with subsequent mechanical drawing and rolling back of the latter.

For production on cope and drag machines, "tight" iron or steel flasks were the original conventional equipment, although "slip" flasks are now in considerable use. Tight flasks remain on the mold during its pouring (See Fig. 7) as compared with snap and slip flasks, which are in constant use by the molders, being replaced by boxes or jackets with an iron weight on top of the mold to resist the force of the metal during pouring.

Cores are made by either hand-ramming of sand into wood, or generally metal boxes, whose interiors are shaped to the desired form of the core, or by forcing the sand with a mixture of compressed air, in a core-blowing machine. Core sand is bonded with a linseed-type oil, or cereal or other binder, including enough moisture to enable the core to retain its form while being dried or baked. After baking at some 400° F and cooling, the cores are firm enough to permit easy handling and setting in the molds. During pouring of the molds, the cores retain their form

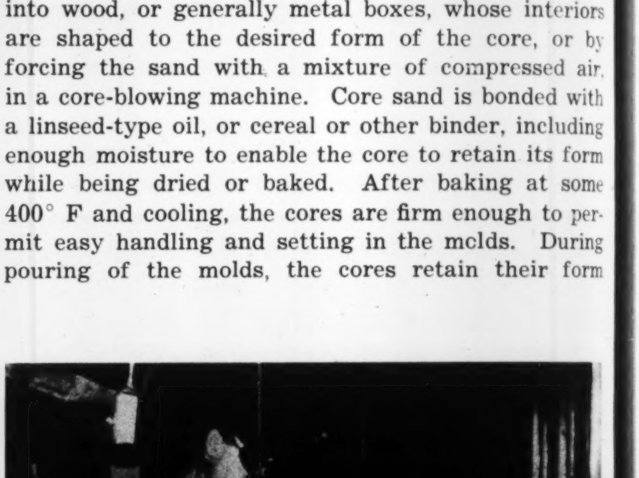

Fig. 7—Molds produced in "conveyor line" molding are poured from large ladles by men standing on conveyor that is synchronized with speed of mold conveyor

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while the molten metal solidifies about them, but subsequently disintegrate, their sand mingling with that of the mold.

In solidifying, the hard white iron contracts about $\frac{1}{4}$-inch per foot, but in the subsequent annealing process, the conversion of the carbon to the free temper carbon form causes an expansion of $\frac{1}{8}$-inch per foot. Accordingly, patterns are made with a net shrinkage allowance of $\frac{1}{8}$-inch per foot. As soon as the castings have solidified and partially cooled, they may be shaken out of the sand molds, which disintegrate so that the sand may be rebonded, tempered and re-used. When cool, the gates and feeders are easily broken from the castings which are subsequently cleaned, inspected and placed in the anneal.

In some plants, generally those producing relatively small castings, areas on the castings where gates or feeders have been removed, are ground smooth to the contour of the casting prior to their being annealed. On most medium and large castings, however, the gate marks or connections are ground following the anneal, or the gate stubs are removed by shearing. This shearing or milling of gates is, of course, only possible following the anneal, as the metal is then tough but ductile and easily machined. The "hard iron" inspection involves examination for obvious defects, spot-gaging of any dimensions which must be closely maintained, and breaking some of the scrapped heavier castings to make certain that no primary graphite is present, also to re-check for soundness.

(To be concluded)

Pollution a Problem

How one big plant solved problem of removing emulsified oil from waste water

INDUSTRY in general is becoming increasingly aware of the problem of water pollution and has been conducting extensive research to correct the condition. In this operation for the removal of emulsified oil from waste water, Chevrolet-Flint Manufacturing Division of General Motors Corp. found that the procedure admirably suited for use in one plant frequently is not effective in another.

According to C. W. Hathaway of the Flint, Mich., plant, in a paper presented before a recent SAE meeting, several of the established procedures were tried and not found to do the desired job. The problem was further complicated by the fact that the plant was not dealing with simple coolants alone, but with a waste that contained various cleaners and other chemicals along with the soluble oils.

It was found that emulsions could be readily broken by the addition of an acid or a salt. It was also found that water containing oil in small quantities could be clarified by coagulation.

As a result of considerable laboratory work, aluminum sulphate and ferric chloride were found to be the best chemicals to use. Factors considered included the most efficient in each step, qualities of being easy to handle, least harmful to workers and equipment and low in cost. Experimental work was tried in a series of tanks varying in size from 150 to 3500 gallons. Drains from the various equipment and dumping points were run to a 1000 gallon sump built underneath the floor near the tank set-up.

The process used consisted essentially of five consecutive steps: 1. Rapid mixing of the waste with some salt such as aluminum sulphate or ferric chloride; 2. separation of the components of the broken emulsion by prolonged sedimentation and oil skimming; 3. rapid mixing, of short duration, of the low oil content water, from step two, with an alkali to bring about precipitation of the coagulant; 4. slow agitation of the suspended hydroxide for the purpose of coagulation. The minute oil particles collect on the hydroxide precipitate; 5. prolonged sedimentation for the purpose of separating the oil bearing hydroxide from the clarified water.

The whole assembly permitted a gravity flow of about 500 gallons per hour. At this rate, the detonation periods for the various steps were approximately as follows: First mix, 25 minutes; oil separation, 3 hours; second mix, 9 minutes; coagulation, $1\frac{1}{4}$ hours; sedimentation, varied from 3 to 7 hours. Results from the experiments led to the design and construction of a full size plant to handle this type of waste. Although the plant is now in operation, it is still considered in the experimental stage. Operations in the range of 10,000 to 12,000 gallons per hour are said to have yielded satisfactory results.

Light for Machining

ILLUMINATION recommendations for some of the major and most exacting lighting problems are included in a report entitled, "Lighting for Machining of Small Metal Parts," published by Illuminating Engineering Society, New York 10, N. Y. The 16-page illustrated report recommends lighting for operations from general and supplementary lighting through lighting for specific tasks, with special attention in the latter section to measuring instruments and rules and graduated feed indicating scales. Other sections prescribe illumination for bench work and inspection and for various types of machines.

International ME Congress

QUALITY is to be the subject of papers to be presented at the Third International Mechanical Engineering Congress to be held in Brussels, Belgium, September 18-23, 1950. Besides papers invited from various European experts, activities of the participants will include visits to some of the principal manufacturing plants in Belgium.

Die Casting Factors

Limitations should be kept in mind when designing part; they are optimum range

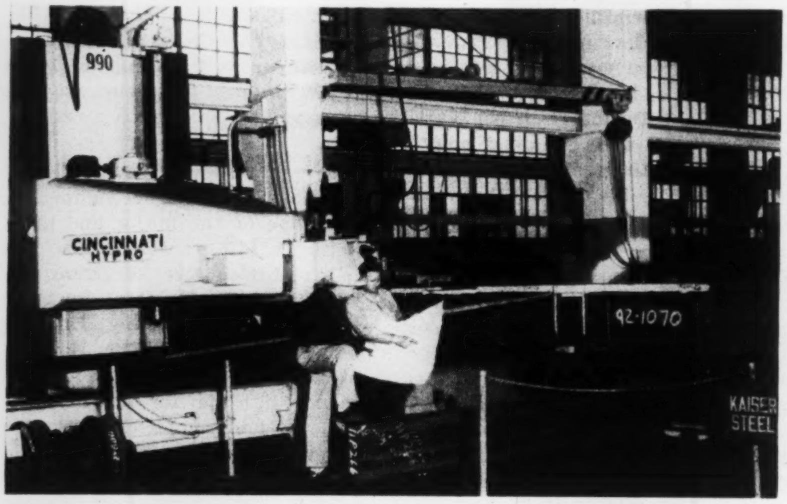
SMALL parts of intricate shape and design requiring resistance to heat, wear or corrosion and having high melting point, nonmachinable alloys specified are widely used and often considered applications of precision castings. There are certain limitations that you should bear in mind during the preliminary stages of design thinking on parts to be produced by this process. These limitations, as specified by Microcast Division of Austenal Laboratories Inc., New York, should be considered as an optimum range for parts to be precision cast:

Minimum weights	2000 per pound
Maximum weight per casting.	1 pound
Longest dimension per casting	8 inches
Thinnest continuous section:	
Over very limited areas ...	0.020-inch
For extensive areas	0.040-inch
Thinnest edge:	
On an angle of 20 degrees .. (on more obtuse angles this thickness may be reduced)	0.015-inch

Most parts made by this process fall within the above specifications. However, many products have exceeded these limitations in one or even all respects and have been found economical for production, it is reported. Coring reduces the weight of a casting, thus effecting a saving in the amount of alloy. These cores are often used, even though the cored hole or recess has no functional purpose. They often permit addition of design convenience or other features and occasionally simplify the problems of casting by their effect on section thickness.

Depending upon the machinability of the alloys involved, round holes often can be drilled more economically than the cored. This is especially true of straight, small holes, the company says. It is usually possible to obtain higher precision both in regard to hole size and location if such holes are drilled rather than cast. With alloys that are comparatively difficult to machine, economy may be found in coring holes undersize, leaving stock for reaming or broaching. When holes are straight but have other than a round cross section, coring undersize and broaching to the finished dimension is said to be the best procedure when close dimensions are involved.

Although special threaded parts may be cast, the threading procedure is reported to be not sufficiently accurate and does not produce smooth enough threads for most purposes. The company recommends that on surfaces requiring threads, the part be cast oversize and the thread be put on by the consumer. A Class 1 fit is ordinarily the best obtainable by casting and in most cases requires chasing.



BEYOND THE CALL OF DUTY: Although the openside planer usually performs an operation on jobs limited to the width of its table, this machine was called upon to plane two blind holes in a part almost three times the table width. Kaiser Steel Corp., Fontana, Calif., found it necessary to machine square openings in each of two 20 foot 2 inch sideguards for the 36-inch blooming mill manipulator. Each sideguard weighed 5½ tons. Job was done on a Cincinnati Hypro openside planer capable of machining objects measuring 6 x 6 x 20 feet.

To support the part of the sideguard which did not rest on the planer table, an auxiliary setup was made using an 18-inch I-beam on the floor. It was placed with its top surface parallel to the planer bed. A fixture containing two rollers was clamped to the job so that the weight would be carried on top of the beam. In that way the planer bed and the rollers carried the entire job to and from the bar. The openings, one of which may be seen above the roller fixture at the right, was planed by short stroking with a poke bar.

Unscramble Steel Products

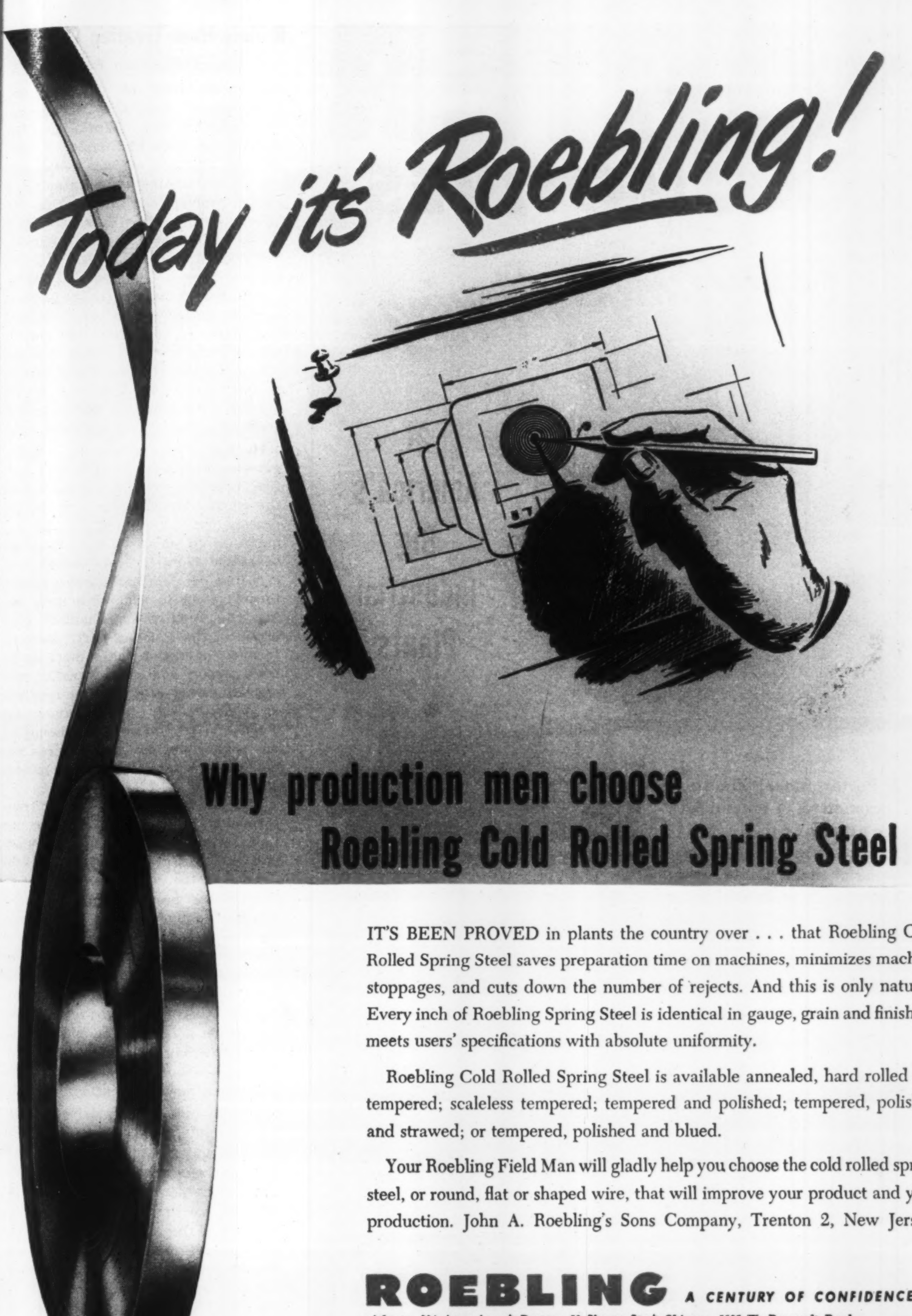
ABILITY to bring order out of confusion and exactness out of guesswork is claimed for a new instrument, the Steelsorter, which is capable of separating semifinished and finished steel products that have become mixed. It differentiates between all types of carbon steel by responding to magnetic differences in the metals, regardless of whether the differences are chemical, physical or metallurgical in nature.

A development of the research department of Jones & Laughlin Steel Corp., Pittsburgh, Pa., the instrument is being made by Fisher Scientific Co., also of Pittsburgh. Designed for use with normal mill stock such as rods and bars, as well as with fabricated parts, the Steelsorter is said to be fast and easy to operate. It is reported that one man can separate several hundred small samples per hour.

Versatility is illustrated by the variety of steel shapes and sizes it can separate. Round bars, flat bars, hexagonal bars or tubes may be separated equally well. When separating long pieces of steel such as mill stock in the form of rods or bars, it is important that only the operator remember that the cross sections of the pieces must be similar.

In one operation, it was possible to remove quickly 200 pounds of rejected tubing from over 154,000 pounds of 3.66-inch ID tubes. In another case with 1¾ x 1-7/32-inch flat bars, 9 tons of rejects were separated from a total of 178 tons.

The magnetic properties of steel are affected by the composition of the alloy, the compression or tension strains due to cold work or rapid quench, grain size, the size of the specimen, heat treatment and aging. These factors influence the permeability, the hysteresis and eddy current losses in the steel. The newly developed instrument is said to be sensitive to changes in all three of these factors.



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Why production men choose Roebling Cold Rolled Spring Steel

IT'S BEEN PROVED in plants the country over . . . that Roebling Cold Rolled Spring Steel saves preparation time on machines, minimizes machine stoppages, and cuts down the number of rejects. And this is only natural! Every inch of Roebling Spring Steel is identical in gauge, grain and finish . . . meets users' specifications with absolute uniformity.

Roebling Cold Rolled Spring Steel is available annealed, hard rolled untempered; scaleless tempered; tempered and polished; tempered, polished and strawed; or tempered, polished and blued.

Your Roebling Field Man will gladly help you choose the cold rolled spring steel, or round, flat or shaped wire, that will improve your product and your production. John A. Roebling's Sons Company, Trenton 2, New Jersey.

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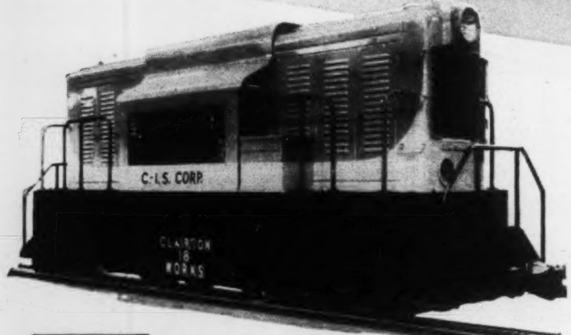
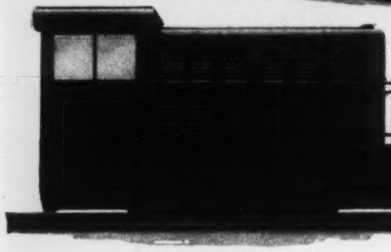
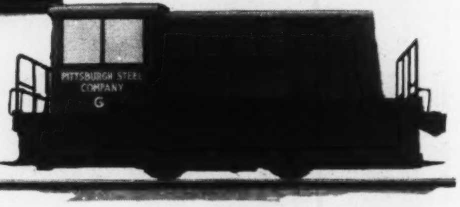
PORTER
LOCOMOTIVES
Keep Things Moving



at
America's
Big
Industrial
Plants





A Porter Diesel Electric Locomotive is a familiar sight around most of America's big steel plants. Some of these plants have fleets of 15 or more Porters, ranging in size from 20 to 100 tons. Porter has been making industrial locomotives for eighty-four years. In those eight-four years, many large industrial concerns have become steady customers of the Porter Company, placing order after order for Porter Locomotives for replacements or additions to their fleet.

Porter engineers will be glad to survey your switching requirements and submit specifications for a standard or, if necessary, a special unit designed to your individual requirements. A Porter engineer can show you how to cut your switching costs.

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PORTER
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Equipment
Established 1866

Reduce Heat Treating Costs

(Concluded from Page 76)

the actual time at dry cyaniding temperature accurately determines the depth of case. Work from this furnace is quenched under a hood so that contact of hot metal with air is eliminated and cleaning is not a problem. Although this furnace is designed for light case work, it has complete utility for producing deep cases of the carburized or dry cyanide type.

A unique feature of this equipment is the incorporation of quenching facilities for hardening the concentrated furnace work load. By providing controlled directional flow of large quantities of quenching oil, cooling rates approaching water or brine quenching have been achieved.

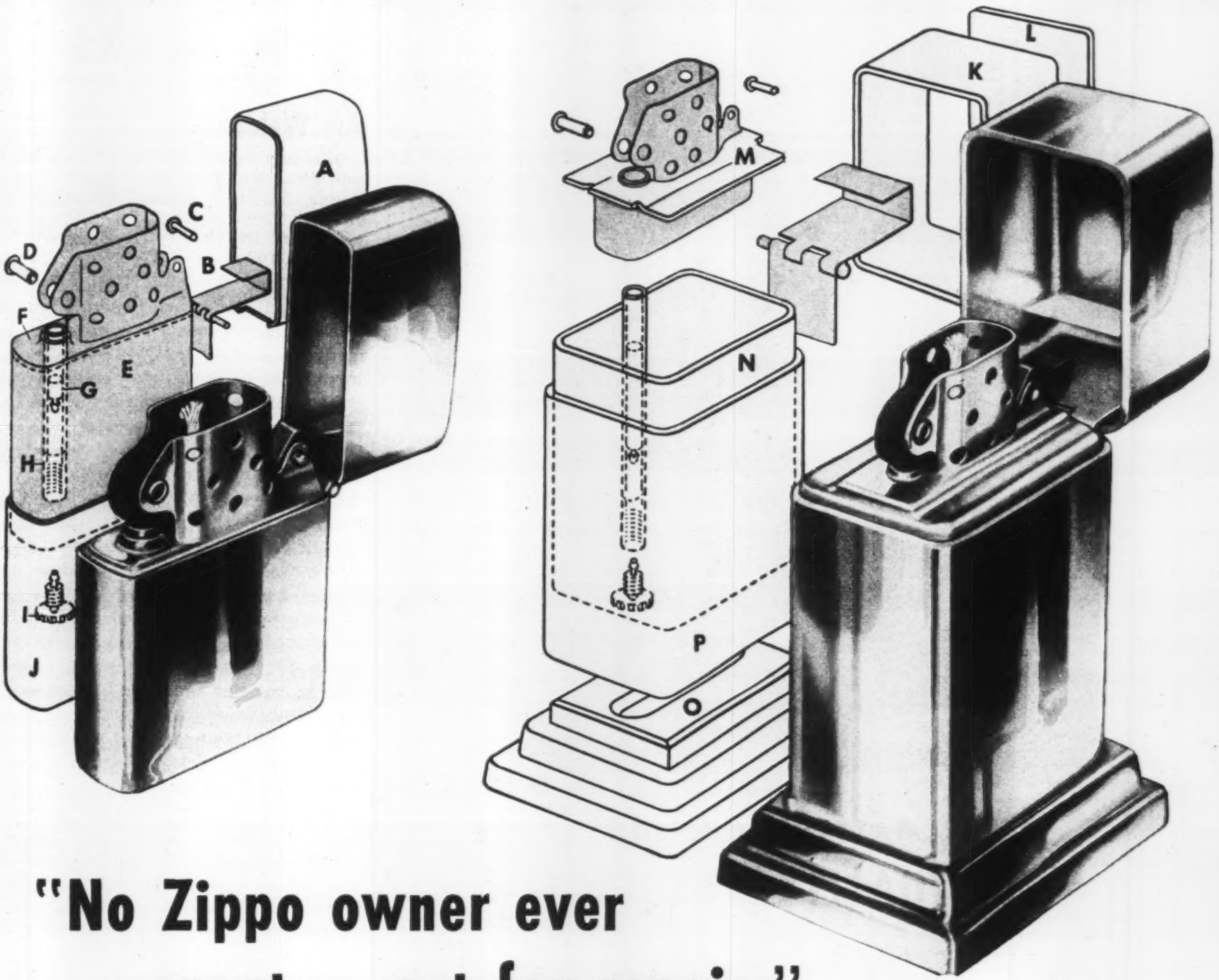
Homogeneous Carburizing—"Homogeneous carburizing" offers a new field operation and a new market for the commercial heat-treater. By this process, the carbon content of steel parts up to about ⅛-inch thick can be raised from the low carbon level, e.g., 0.15 per cent carbon of a readily-formed steel to that of a steel having the required mechanical properties in the finished part. Since the forming operation takes place on the low carbon material, drastic press operations are possible with minimum die and other production costs. Typical parts suitable for homogeneous carburizing are small pieces such as washers, ferrules, wire springs, etc.

The low carbon steel is then transformed to steel of higher carbon content throughout its entire thickness, and not to a given depth only, while control of the carbon potential of the atmosphere prevents further carbon additions above those desired no matter how long the pieces remain in the furnace. When the parts can be advantageously formed from low carbon steel by bending, stamping, or machining, then made hard or springlike by carbon additions followed by suitable hardening treatments, the homogeneous carburizing process will find numerous new applications.

Thicknesses of material are limited commercially to a maximum of about ⅛-inch, but the thickness may be increased somewhat if some reduction in final carbon content in the center of the section is permissible.

Most of the furnaces previously described as applicable for case carburizing operations can be employed satisfactorily for homogeneous carburizing, by using a suitable endothermic atmosphere gas generator.

From data presented by the author before the annual meeting, Metal Treating Institute.



"No Zippo owner ever spent a cent for repairs"

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How does Zippo do it? First, the design of the lighter is excellent. Second, meticulous care is employed in fabricating, assembly and finishing. And third, let's not overlook the fact that the Anaconda Copper Alloys used for the components illustrated were carefully specified for composition, grain size, form and temper.

Moral: Your product will be worth more if it's made of brass, even if it costs more. And very often the extra metal cost is offset by longer tool life and lower fabricating costs . . . in lower plating and polishing costs . . . in a longer, rustless, usually expense-free service life. We'll be glad to help you find out. Address The American Brass Company, Waterbury 20, Connecticut. In Canada, New Toronto, Ont. 5098

POCKET LIGHTER A and J, top and bottom of outside case, deep drawn from brass strip. B, nickel silver hinge and pin. C, solid brass cam rivet. D, tubular brass rivet for flint wheel. E, nickel silver inner shell and chimney. F, nickel silver top plate. G, brass flint follower. H, seamless brass flint tube. I, brass flint tube screw.

TABLE LIGHTER K and P, special shape seamless brass tube for top and bottom outside case. L, brass top plate. M, brass chimney seal plate. N, special shape seamless brass tube, telescopic fit. O, die pressed brass forging. Chimney unit and its components are the same as the pocket lighter. Both lighters are finished in gleaming chromium plate.

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New Books

Arc Welding

Electric Arc Welding Procedure and Practice; flexible leatherette, 544 pages, 5¾ x 8 inches; published by Hobart Trade School, Troy, O.; available from STEEL, Penton Bldg., Cleveland, O., for $3.

This text book on the procedure and practice of arc welding has a two-fold approach: First, through the medium of the text, the student is introduced to the fundamentals which enable him to understand what is taking place in the process; second, through practical welding exercises, he learns the various manual operations involved. Although written primarily for the student, the book should also be of value for the practicing welding engineer, welding operator and designer, as well as for executives and supervisors interested in procedure and practice. In addition to these two divisions, a section on special arc welding processes and application is provided to further the knowledge and training of the operator in advanced and specialized types of arc welding.

Book is divided into 28 chapters in five sections: General information; operator training course; carbon arc welding and cutting; other welding processes; welding terms and their definitions. One of the features of the book is the large number of photographs and drawings effectively used to illustrate various operations.

Steelmaking

The Story of Steel, by Max Davies; cloth, 96 pages, 7⅜ by 9⅝ inches; published by Burke Publishing Co., Ltd., London, England.

Written in words and phrases understandable by the layman, this book, published in England, places the history of steel, both in words and pictures, from the earliest time to the present day. In the words of its preface, it links King Arthur's "Excalibur" with the modern jet engine.

First half of the book gives an account of man's increasing mastery over metal, stressing human efforts that have made progress possible. Mention is made of the earliest iron making efforts, and the reader is brought up through the middle ages to the 19th century when the new iron age takes shape. The second half of the book studies the progress subsequent to the industrial revolution, modern manufacturing methods and present expansion, showing the many industries dependent upon steel. Chapters are devoted to raw materials, open hearth furnace, bessemer converter, electrical and crucible steelmaking and shaping and treating of steel. An excellent book for the student of steelmaking, it is illustrated with 86 line drawings and photographs.

Ordering Steels

Les Aciers et Speciaux Francais (French Fine and Special Steels); cloth, 332 pages, 6¼ x 9¾ inches; published by French Fine and Special Steels Producers Association, Paris, France.

Written by prominent technicians and covering the latest procedure for producing fine and special steels, the purpose of this book is to acquaint manufacturers with the steel works producing the various kinds of steel. Another purpose is to prevent those who are ordering steel from making these two mistakes: Ordering a steel of poor quality, having in mind only the economy thus realized; or looking for a steel presenting the most elaborate characteristics, while another steel, somewhat less expensive, could meet the demands of the consumer. The well-indexed book contains many photographs and tables and includes a French-German-English-Spanish dictionary.

Forging Practice

Manual of Open Die Forgings; cloth, 181 pages, 6¼ x 9¼ inches; published by Open Die Forging Industry, New York; available from STEEL, Penton Bldg., Cleveland 13, O., for $3.00.

Forgings, whether they be large or small, are playing an important part in such industries as oil refining, chemical, power generation, construction and contracting, mining, shipbuilding, etc. An important advantage in the manufacture of open-die forgings is the flexibility of the process, a characteristic which makes it so widely adaptable. This manual describes the methods, practices, specifications and inspection used in the manufacture of open-die ferrous forgings and explains and clarifies the existing terminology of the art.

Improved methods and practices evolved through the years in the making of forgings for these many industries, and new products and applications developed, often make it difficult to apply old terms to changed conditions. Recognizing this need, and knowing that forging industry words commonly vary with dictionary definitions, the manual has been prepared so that manufacturers, engineers and consumers alike have the benefit of a common terminology. Book is divided into three chapters, each with many subheads: Manufacturing practices, specifications and

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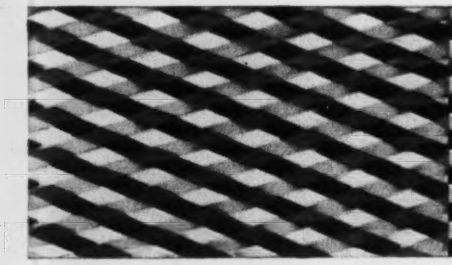
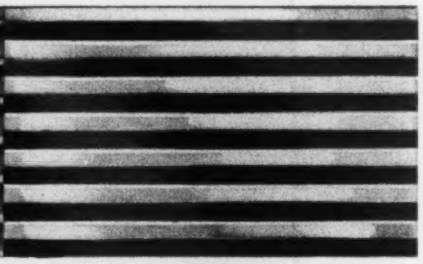


Nickeloid Metals Diamond Crimp



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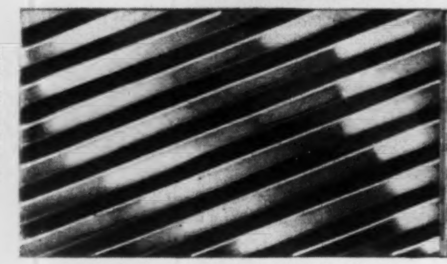
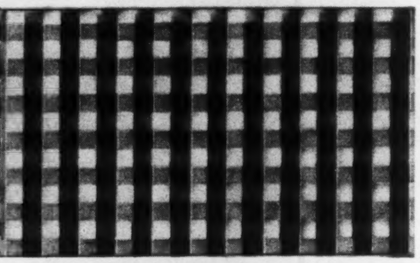


Nickeloid Metals Diagonal Crimp



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testing, conditions which may be detrimental to service life. A complete glossary and many pages of tables enhance its value.

Gear Cutting

Gear Cutting Practice, by Fred H. Colvin and Frank A. Stanley; cloth, 532 pages, 6½ by 9¼ inches; published by McGraw-Hill Book Co. Inc., New York; available from STEEL, Penton Bldg., Cleveland 13, O., for $4.75.

Described as a practical machinists' guide to gear cutting methods and standards, this revised third edition contains over 200 illustrations, plus many quick reference tables. It shows how to handle all kinds of gear jobs by the methods used in leading shops, describes the various types of gears, setting up and operation of machines for producing them and cutting and finishing methods.

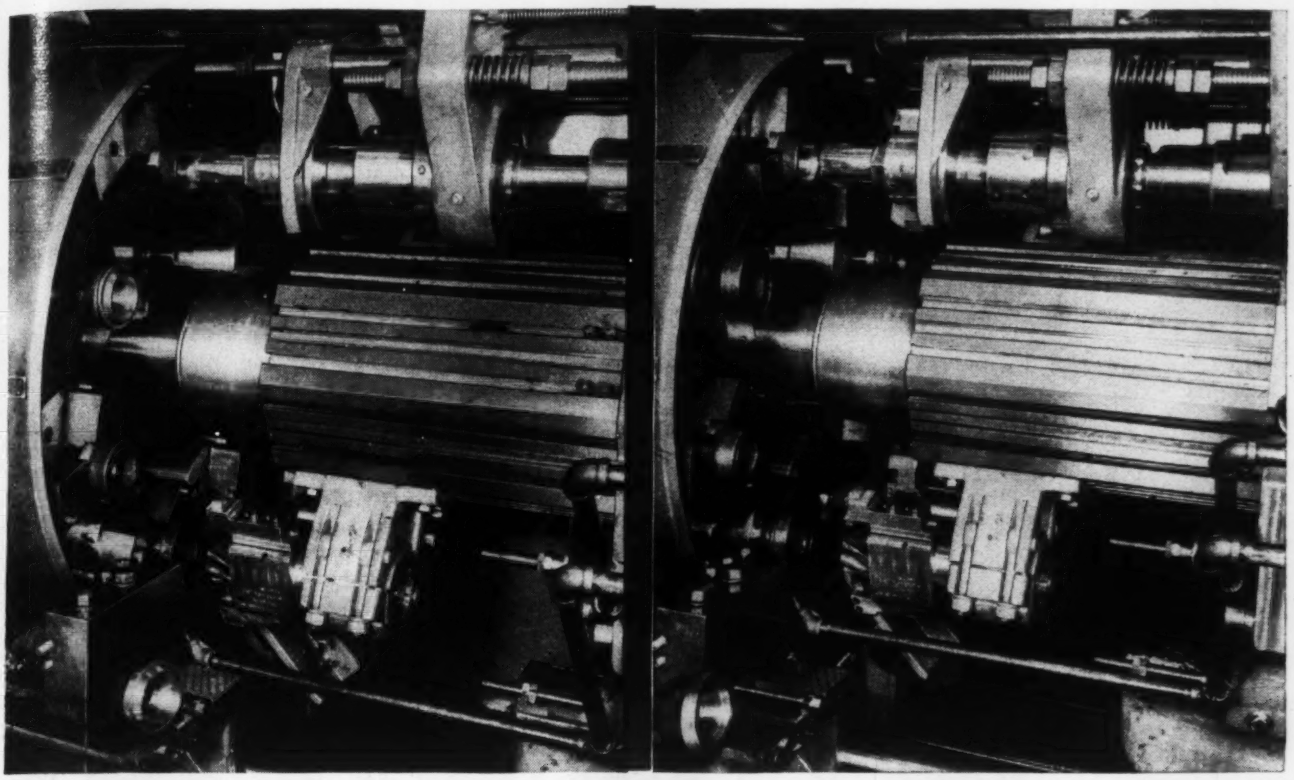
Contents have been rearranged to make the data more accessible. Added material includes that on carbide-tipped hobs, hobbing speeds and feeds, new bevel-gear standards, new methods of cutting bevel gears, data on involute splines, new shaving and lapping methods of finishing gear teeth and new inspection methods. Divided into 11 sections, it shows the latest machines and methods for making gearing of different kinds and checking their accuracy. Also presented are the latest standards adopted by American Standards Association and the American Gear Manufacturers Associtions.

Flow Engineering

Principles and Practice of Flow Meter Engineering, by L. K. Spink; 416 pages, published by Foxboro Co., Foxboro, Mass.; available from STEEL, Penton Bldg., Cleveland 13, Ohio, for $7.

Enlarged edition, the seventh since the book was first published, includes much additional information on all phases of flow engineering. So thorough that it requires an eight page index to list the subjects treated, the book contains information for calculating an orifice, flow nozzle, Venturi tube, Pitot tube or pipe elbow used for flow measurement. The common pressure tap locations are discussed and data given to correct for odd tap locations. Liquids, steam or other vapors, and gas are handled in separate sections.

The book presents instructions, curves and tables in logical sequence and simple manner. Viscosity corrections are also furnished in convenient form. New features in this edition include equations and curves for calculating throttling orifices to be used at critical pressure drops, section on measurements of fluid flow in metric



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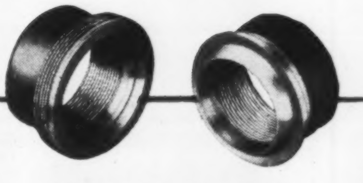
"Your 8" Model RPA-8 spindle Acme-Gridley Chucking Automatic, arranged for double index, has, as nearly as we can estimate, increased production in our plant 500%, on the work to which this machine has been assigned.

"In addition to this increase, we are obtaining a more uniform product than formerly when we moved the work from one machine to another. The operators also report that the ease of operation is considerable over the former method."

Such savings are not unusual for Acme-Gridley users—and here's why:

Sturdy frame construction; wide, open tooling zones, with plenty of room for timesaving power-driven auxiliaries; simple, direct camming—these and many other exclusive Acme-Gridley features all add up to *"More Good Pieces in the Pan at the End of the Day."*

May we show you how the modern, more versatile Acme-Gridley Automatics can increase production and cut costs in your shop?



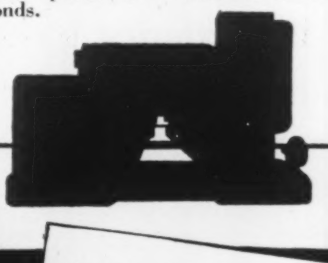
JOB FACTS

PARTS: Forged Steel 2" Pipe Union, head and tail pieces.

MACHINE: Acme-Gridley 8" RPA-8 Chucking Automatics arranged for Double Indexing to finish both ends of a piece in one setup.

OPERATIONS: On head piece, 13—machine time 31.5 seconds.

On tail piece, 12 — machine time 31.5 seconds.



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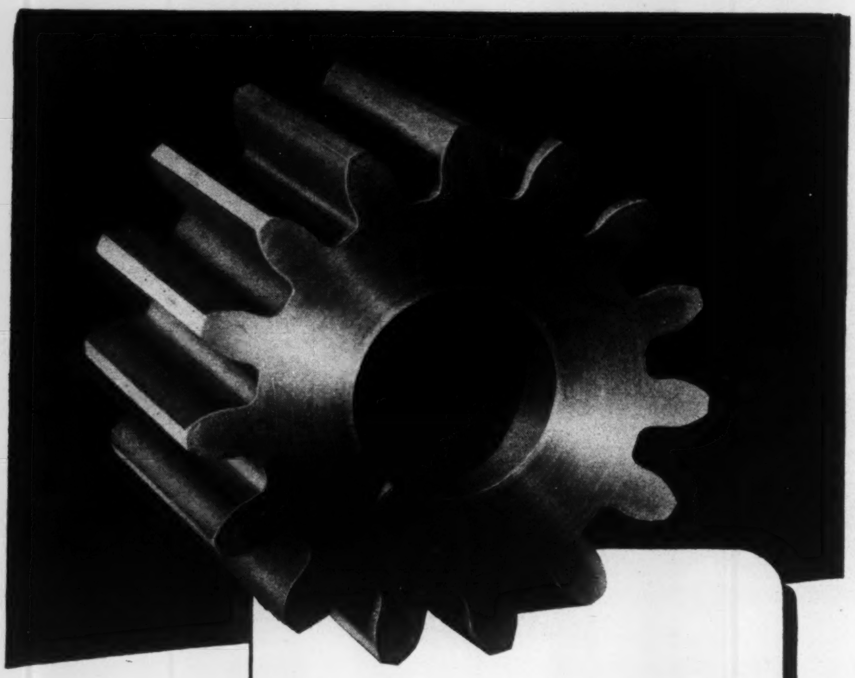

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units, a table of corrections for barometric pressures and simplified instructions for use of the square-root planimeter on gas meter charts. A new section is contributed by R. L. Parshall, giving design details, operating instructions and tables for measuring flows through open channels by means of weirs and flumes of the Parshall flume of his invention.

Punches and Dies

Punches and Dies, by Frank A. Stanley; cloth, 583 pages, 6½ x 9¼ inches; published by McGraw-Hill Book Co. Inc., New York; available from STEEL, Penton Bldg., Cleveland, O., for $4.75.

Now in its fourth edition, this book has various chapters which have been rearranged in order to present additional data in the proper sections and relocate certain information formerly found in other positions in the volume. The extension of the use of piercing, notching and other dies with inserts of cemented carbide marks one of the great advances in press room practice throughout the sheet metal stamping industry; these dies, together with details of typical layouts, form one of the new sections in this book. Use of press tools designed especially for stainless steel piercing and blanking operations is another new operation covered.

The book attempts to cover each phase of modern punch and die work. It makes clear the practical fundamentals and shows the layout, construction and various uses of punches and dies for specific types of work. Included is specific information covering the development of die design, the use of metal stampings for complicated construction and data on sectional dies and big press work. Extensive use is made of drawings, photographs and tables.

Metallurgy

Beitrage zur Metallkundlichen Analyse (Contributions to Metallurgical Analysis) by P. Klinger and W. Koch; 104 pages, 7 x 10 inches; published by Verlag Stahleisen, Dusseldorf, Germany.

Based on ten years of work in Krupp's research laboratories, this book is a collection of three separate papers on isolating nonmetallic inclusions from carbon steels and from alloy steels, and on studying them physically as well as chemically. Electrolysis and chlorine vacuum sublimation were employed in the research work.

According to the book, the cleanly isolated specimens containing SiO_2, Al_2O_3, FeO, MnO, were glassy and could be investigated by their coefficients of optical refraction. Speci-

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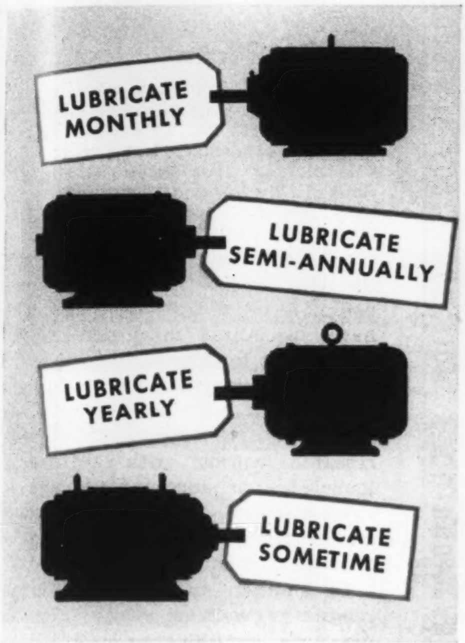

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BILLETS AND FORGINGS FOR PRODUCTION, TOOL ROOM AND MAINTENANCE REQUIREMENTS.

men examination by ultramicroscope furnished the information. Carbides were also isolated and examined microscopically with up to 60,000 magnifications. Spectroscopic analysis was found to be accurate with specimens weighing as little as one half milligram.

Welding Terms

Welding Dictionary, French-German-Spanish-English, compiled and edited by R. N. Thompson and G. Haim; leatherette, 234 pages, 5 x 7½ inches; distributed by Iliffe & Sons Ltd., London, England; available from STEEL, Penton Bldg., Cleveland 13, O.

Like all new techniques, welding has given rise to a considerable number of new words and phrases which have specialized meanings. As this often leads to difficulties in the reading of foreign literature, this dictionary was published with the idea of enabling the welding engineer and research worker with an average knowledge of another language besides his own to be able to understand the technical publications of a different country.

In addition to terms specifically related to welding, many other expressions pertaining to electrical and mechanical engineering and to metallurgy are included. The English section is treated as a key glossary with equivalents in the other three languages.

Social Security

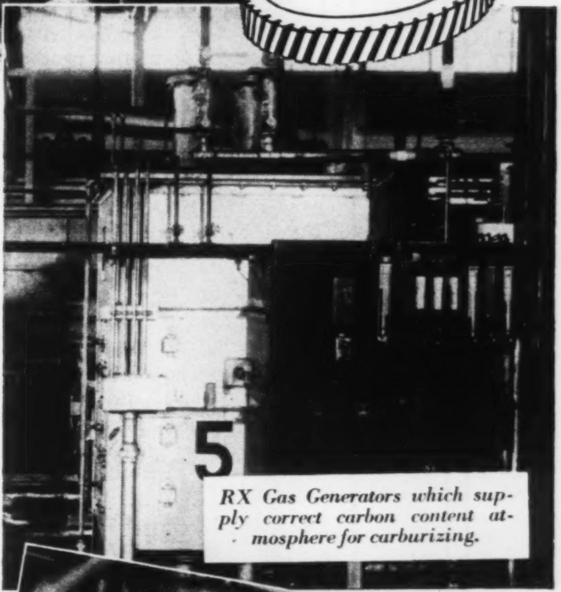
The Cost and Financing of Social Security, by Lewis Meriam, Karl T. Schlotterbeck and Mildred Maroney; cloth, 193 pages, 6¼ x 9¼ inches; published by Brookings Institution, Washington, D. C.; available from STEEL, Penton Bldg., Cleveland, O., for $3.

Objective of the book is to focus attention on the magnitude of the expanding costs and the problems involved in financing them and to raise the question as to whether a safer and better system of social security could readily be devised. This is all part of a trend in recent years towards giving the individual additional security, with the federal government providing protection against unforeseen accidents and hazards of life.

With the government advocating social security system extension and reform, the book surveys the programs recommended as well as those now existing, the benefits involved and the rapidly growing burden of cost. The authors show how these proposed welfare plans will ultimately have to be paid for and analyzes the insurance mechanism employed in supplying benefits for old age, survivors and disability.

GAS CARBURIZING

Entrance end of three-zone Gas Carburizing Furnace. The pusher mechanism for continuous operation is shown at right.



RX Gas Generators which supply correct carbon content atmosphere for carburizing.

Entrance end of two-row Gas Carburizing Furnace.

Multiple Uses of GAS for Heat Treating at SPICER MANUFACTURING

DIVISION OF DANA CORPORATION

Emphasizes Versatility of GAS for Metalworking

INCREASED PRODUCTION of case hardened precision gears and pinions is obtained from these GAS heated furnaces. Two-zone furnaces, manually operated, carburize ring and side gears, pinions and pinion mates. Four-zone furnaces automatically carburize and quench shafts and gears for heavy-duty transmissions and torque converters.

Parts are carburized in these controlled atmosphere furnaces, which utilize GAS radiant tube heating. With GAS heating, the accurate control of temperature permits uniform case hardening day after day, with warp and distortion held to a minimum. This precise production control is vital since most of the heat-treated heavy-duty gears are used without further grinding.

OPERATING DATA

	Zone 1	Zone 2	Zone 3	Zone 4	Capacity lb/hr	Cycle
2-zone furnace	1700°F	1650°F	....	....	660 net	7 hr
	Continuous pusher type with fan circulation of gas					
4-zone furnace	1725°F heat	1725°F Carburize	1150°F Cool	1550°F Reheat	920 net	10 hr 48 min

These carburizing furnaces provide another example of the versatility of GAS for metal treating with characteristic results:

- **Increased Production Rate**
- **Superior Grain Structure in 8620 or 4320 gear teeth**
- **Uniform case depth and carbon concentration with continuous operation**
- **Consistent low rejection loss due to warp and distortion**

The heat treating methods at Spicer Mfg. Division, Toledo, demonstrate some of the ways in which GAS can be applied in manufacturing precision parts. Your Gas Company Representative is ready to show you how to make effective use of GAS in *your* heat-treating applications. Call him today.

MORE AND MORE...
THE TREND IS TO GAS
FOR ALL INDUSTRIAL HEATING

Photographs — courtesy of Surface Combustion Corporation, Toledo, Ohio, Manufacturers of Industrial Gas Furnaces.

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Continental Twin Chamber Annealer of the recirculating type with automatic conveyor transfers and close-tolerance control for time temperature cycle.

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Six Continental "Top Hat" Cover Type Furnaces for bright annealing high carbon steel complete with gas generator and automatic controlled time temperature cycling

problems to results . . .

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Our 25 years' experience and diversified research have produced numerous original designs and improved procedures. All of this data is available for preliminary planning. CONTINENTAL invites you to share its engineering "round table" to discuss the expansion, remodeling, or modernizing plans you have in prospect. There is no obligation.

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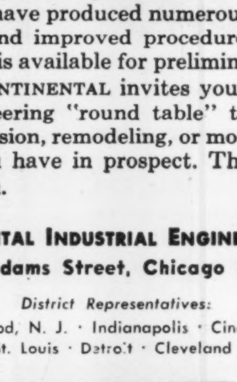
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LETTERS
to the Editors

Information on Steels

We are very much interested in obtaining a book containing all the various types of steel, listed by their trade name, a brief description of its uses, a brief analysis and the heat treat instructions. Would you be good enough to advise where such a book might be obtained?

R. J. Benigni
Impression Die Co.
Detroit, Mich.

The editors of STEEL have compiled a "Guide for Selecting Tool Steels and Carbides," a most complete book listing all of the information you desire on this type of material. It is available from our Readers' Service Department for $1. Information on all types of steels is available from American Iron & Steel Institute, 350 Fifth Ave., New York 1, N. Y.—The Editors

Facts and Figures

We have noted with interest your article entitled "Metalworking Facts and Figures," appearing on pages 123 to 154, inclusive, of the Jan. 2, 1950, issue of STEEL. It would be appreciated if you would please send us three reprints of this special 32-page section, invoicing us for any charge involved.

Robert B. Parker,
Manager of Sales
Special Accounts Office
Carnegie-Illinois Steel Corp.
Washington, D. C.

The three copies are being sent with our compliments.—The Editors

Hot Milling

Will you please send us two reprints of your article on hot machining which appeared in the Feb. 26 issue of STEEL. We would also appreciate receiving any information you may have on hot milling.

R. Trudeau, Librarian
Research Laboratory
L'Air Liquide Society
Montreal, Que.

Tearsheets of the Feb. 26th STEEL article are being sent.—The Editors

Fundamentals

Your magazine is currently running a series of articles under the title, "Fundamentals of Steelmaking." Information is requested as to just when you expect to conclude this series. We are interested in the accumulation of this feature from the first issue through to the last, at which time all articles will be compiled into a species of volume best adapted to its physical condition.

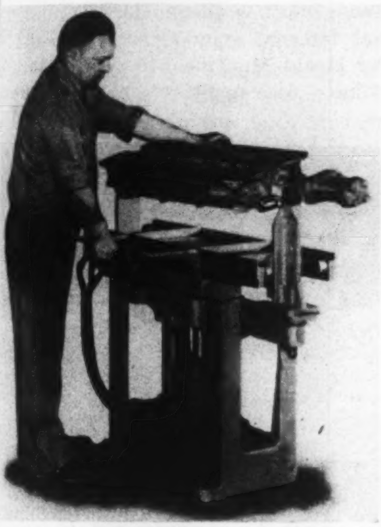
Incidentally, we might inquire if you intend to publish this material

New Products and Equipment

Speeds Core Drawing

Capable of performing one complete core-draw cycle in as little as 18 seconds is the model CD-36 core drawing machine designed by Spo Inc., 6494 Grand Division Ave., Cleveland 5, O. Unit can be used singly, in pairs for double shuttle operations and in circular conveyor system with any type of core blower. Only one man is required for operation. Power is furnished by 80 psi air line. An enclosed lifting mechanism (front and rear) and a one-piece lifting yoke eliminates need for links and squaring shafts.

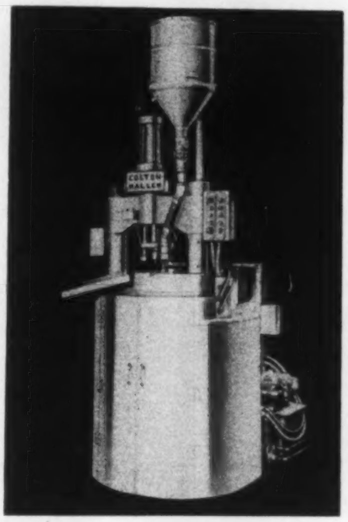
Core box is positioned easily and rapidly by parallel sets of dust-tight ball bearing rollers and guide rails. After core plate is clamped in place, core box is lifted pneumatically for manual roll-over. Core plate supports are then positioned and core box lowered. Removal of plate clamps permits box to be drawn automatically for core removal and subsequent handling operations. Height of machine is 32 inches, although special heights may be made to meet specific height of core blowers. Core boxes ranging from 24 to 36 inches may be handled.



Check No. 1 on Reply Card for more Details

Single-Punch Hydraulic Presses

Designed for rapid approach speeds and slow pressing feeds are vertical single-punch hydraulic presses for powdered brasses, copper alloys, iron, steel, stainless steel, etc., made by Arthur Colton Division, Snyder Tool & Engineering Co., Detroit 7, Mich. Equipment incorporates patents, designs and process techniques developed by Michigan Powdered Metal Products Co., Northville, Mich. The Colton-Haller presses will be made in the following capacities: 25 ton with 5-inch fill; 40 ton with 8-inch fill; 100 ton with 9-inch fill; and 125 ton with 9-inch fill.



Smallest model is a two tie rod press; the others have four tie rods. Fills are adjustable from zero to the machine's capacity. Filling is by reciprocating shoe mechanism for powdered metal work. Shuttle feed is offered for plastic preform work. A wide variety of motions is available: One from above, one from below with stationary core-rod; one above, two below, both pressing motions; one above, two below, one of the latter a pressing motion and internal motion a movable core-rod; two above and one below; two above and two below. Floating die tables are optional equipment.

Check No. 2 on Reply Card for more Details

Gas and Air Flow Indicators

Accurate data about gas-air mixture ratios required for precise combustion requirements may be obtained from flow rate indicators designed by Selas Corp. of America, Philadelphia 34, Pa. Located upstream from the mixing equipment, the Flo-Scopes are used where controlled protective atmospheres are required for the prevention of high temperature deterioration of material during heat treatment.

Units also measure components entering special atmosphere generators and the cool protective gases delivered from generators or from storage cylinders. They maintain proportions of gaseous ingredients entering synthesis and measure the flow of protective gases that prevent fires or slow oxidization of materials. Each instrument is individually calibrated under laboratory conditions without time limitation for the characteristics of the gases that are to be measured.

Check No. 3 on Reply Card for more Details

Heavy Duty Fork Truck

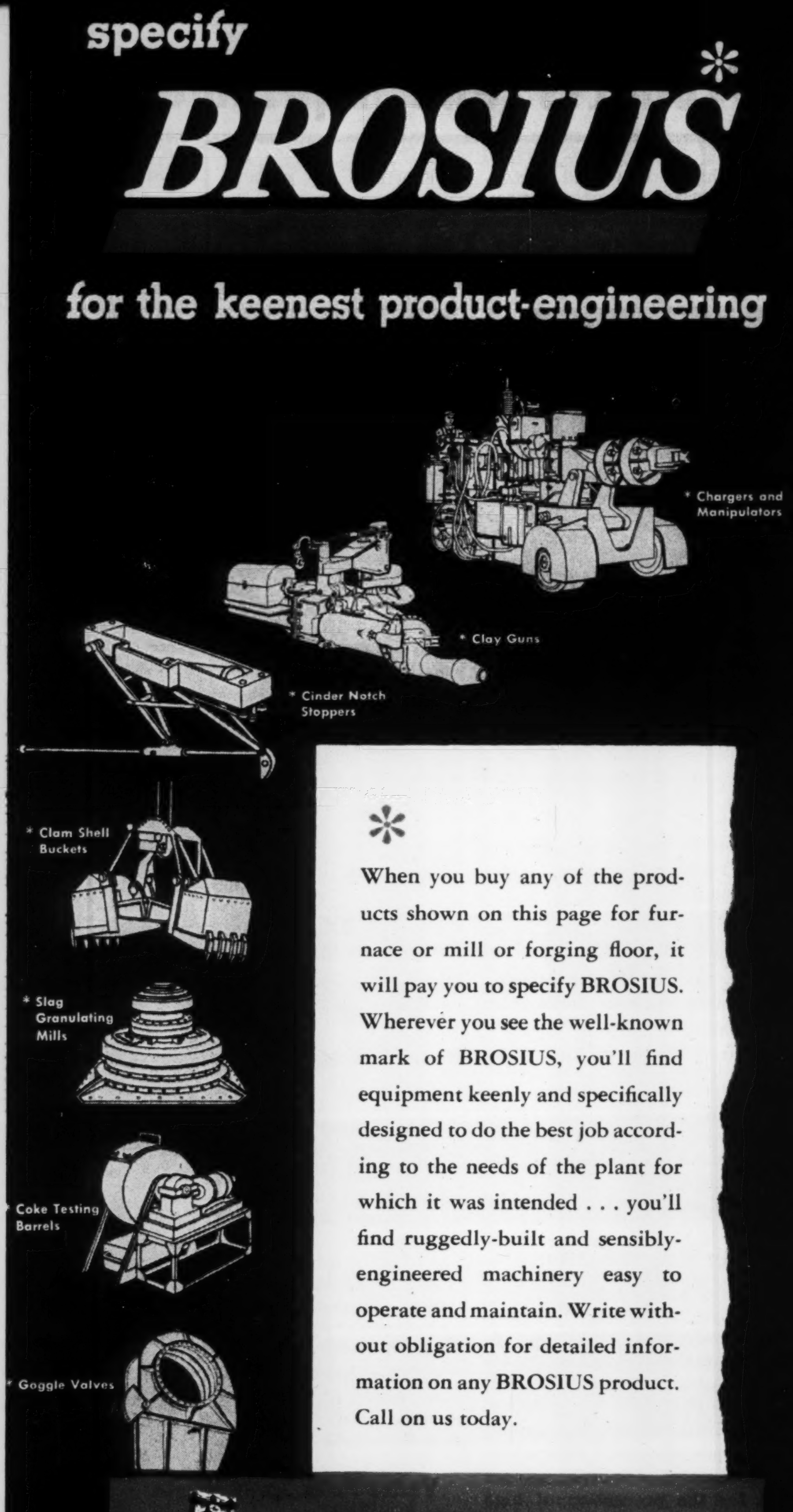
Motowlift line of fork lift trucks is being expanded to include heavy duty models in the 4000 and 6000-pound capacity class, according to Service Caster & Truck Corp., Albion, Mich. Dual-pneumatic tired models are powered by Ford 6-cylinder industrial engines. The heavy-duty integral drive axle and constant mesh transmission made by Timken is incorporated in the design, along with a special Borg-Warner clutch which may be replaced in 2 hours without removing engine or transmission.

A single lever controls lifting and tilting operations; gear shift lever is of the single lever automotive type. Mast channels are formed from ¾-inch extra strength steel. Carriage is equipped with eight hardened, anti-friction rollers and two lifting chains with a strength of 24,000 pounds each. A variety of lifting heights is available.

Check No. 4 on Reply Card for more Details

Varies Paint Spray Width

Spray pattern may be varied from the size of a silver dollar to more than 12 inches wide, by a spray gun embodying a controllable nozzle, developed by Eclipse Air Brush Co., 390 Park Ave., Newark 7, N. J. Called the 47 nozzle, it operates on



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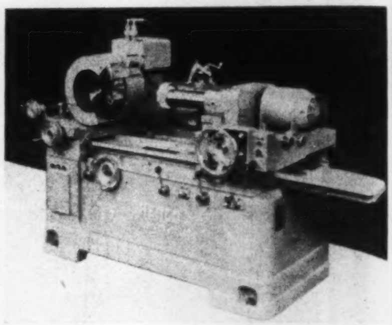
the low pressure principle for a reduction in fumes, minimum air consumption and a savings in paint. The GAT-2 gun features a four-finger trigger, enabling use for longer periods without fatigue.

Combined features make the unit flexible enough for use on all kinds of surface coating operations where accurate control and adjustment are desirable. Operator may project a stream of atomized material in a workable pattern to normally inaccessible surfaces up to 6 feet beyond his reach. A thumb screw at the back of the gun changes the spray pattern. Gun is served by separate lines carrying compressed air and coating being applied.

Check No. 5 on Reply Card for more Details

Handles Variety of Work

Designed for a wide variety of tool room work is the model 274 universal internal grinding machine made by Heald Machine Co., Worcester 6, Mass. Also applicable to longer production operations, the machine's workhead may be swiveled up to 90 degrees, providing wide angular capacity.



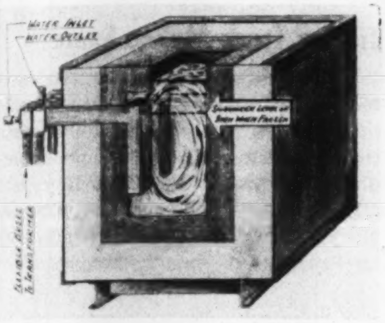
Work head is driven hydraulically, permitting an infinite variety of speeds within the range of 40 to 350 rpm. Machine will grind straight or taper holes, straight or taper outside diameters and flat or convex surfaces.

Check No. 6 on Reply Card for more Details

Submerged Electrode Furnaces

For use with salt baths operating at temperatures from 1700 to 2400° F, as well as for exceptionally deep baths, is the Ajax Hultgren salt bath furnace with submerged electrodes, offered by Ajax Electric Co., Frankford and Delaware Aves., Philadelphia 23, Pa. Electrodes entering through the back wall of the furnace just below the bath surface are closely-spaced to produce electrodynamic stirring action, assuring rapid heating and temperature uniformity within 5 F. Electrodes are positioned so that if the bath should freeze from any cause, the salt will shrink sufficiently to expose the electrodes for restarting in a manner similar to a standard Ajax furnace.

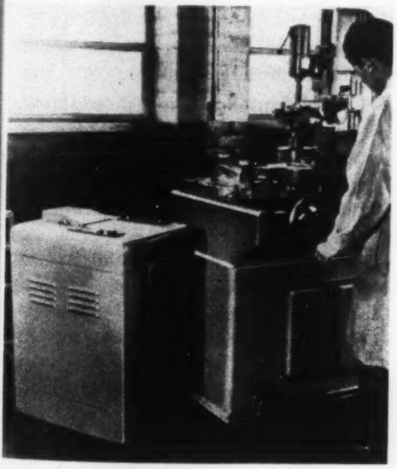
Use may be for such operations as neutral hardening carbon and alloy steel, annealing and hardening stainless steel, heating for forging and brazing. With submerged electrodes used for high temperature work, their life is extended as they are not exposed to severe oxidizing action which takes place above the bath surface.


WATER INLET
WATER OUTLET
SUBMERGED LEVEL OF BATH WHEN FROZEN
FLEXIBLE CABLES TO TRANSFORMER

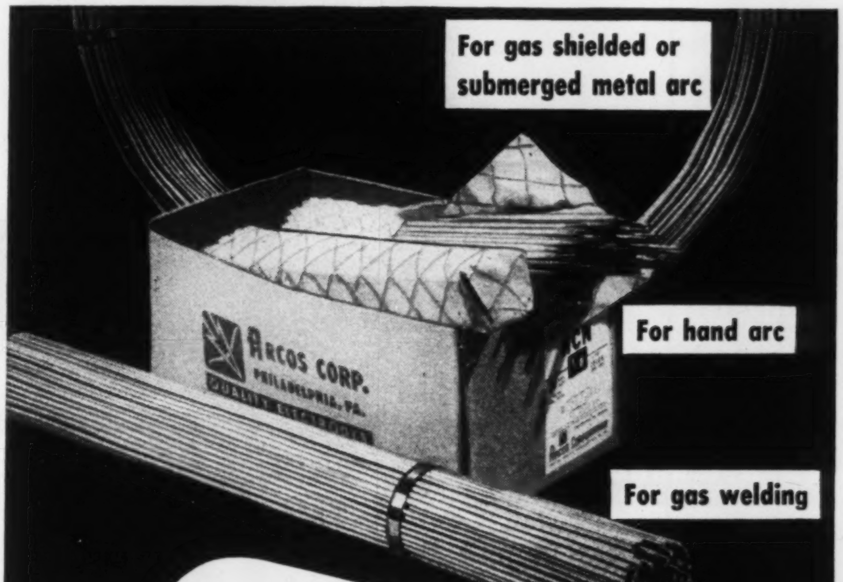
Check No. 7 on Reply Card for more Details

Records Gear Measurements

Permanent chart records of involute tooth forms, tooth spacing, leads, contours, thread forms, etc., may be obtained from the model MTR-1 improved automatic checking recorder, announced by Michigan Tool Co., Detroit, Mich. Although it has other applications, it is designed primarily as an accessory to the Sine-Line gear checking equipment. Up to 0.002-inch of error, both plus and minus, may be recorded automatically across the chart of this instrument.



Improvements include a selective two-speed chart drive and a new standardized interchangeable electronic gage head. Pen movement is



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per minute

. . for air to 125 P. S. I.— or vacuum
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● These valves combine the utmost simplicity in design with rugged construction. They will give millions of cycles of highly satisfactory and efficient trouble-free service. Small solenoids, with short strokes work against the valve plunger, eliminating levers, links and pins. Low amperage requirement eliminates intermediate relays and simplifies electrical control circuits. Side or bottom pipe connections. Valve body and solenoid are both mounted on an aluminum base and can be removed without disturbing the piping. 2, 3, 4 and 5-way actions. *Write for Data Sheet No. 1741.*

Individual DATA SHEETS for Each Valve — give complete details. Write today!

Hand Operated Air Valves—wide variety of uses. 2-way, 3-way, 4-way neutral position and compound exhaust.

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Series "O" and "OE" Valves—for air or hydraulic service up to 125 PSI. Push-pull, cam, pilot, diaphragm and solenoid operated. 1/8" and 1/4" pipe connections. 2-way, 3-way, 4-way and 5-way actions.

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Hydraulic Valves—Up to 5000 PSI. Pilot cylinder operated. 1/2", 3/4", 1", 1 1/2" 2", 2 1/2" 3" and 4" sizes 2-way, 3-way, 4-way actions.

Quick-As-Wink
Control Valves

THE HIGHER THE PRESSURE THE TIGHTER THE SEAL

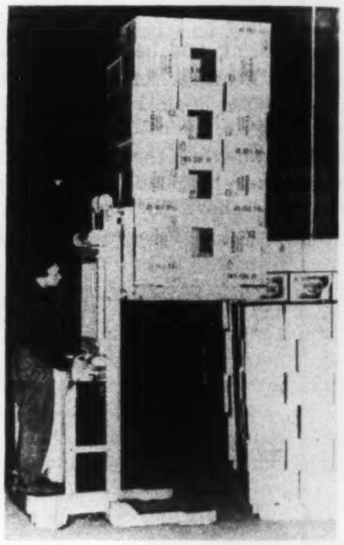
Manufactured by C. B. HUNT & SON, Inc.
1911 East Pershing Street, Salem, Ohio

1/8-inch per 0.0001-inch of checker indicator finger movement. Chart drives give 1/2-inch of travel for either 1 or 2 degrees of work rotation. No recorder adjustments are required when plugging in the lead from an electronic gage head mounted on a different checker.

Check No. 8 on Reply Card for more Details

Tiering Truck Makes Space

Aisle width may be reduced to 6 feet in warehouses and other types of buildings, with use of an electric tiering truck of the telescopic straddle type, made by Lyon-Raymond Corp., 9169 Madison St., Greene, N. Y. The SpaceMaker truck may be furnished to handle any standard size two-faced pallet. Forks elevate to 130 inches.



Power unit assembly containing the drive and elevating motors, battery, etc., is interchangeable on all types of the company's electric tiering trucks. Power unit assembly on the telescopic model is 29 inches long and 27 inches long on the nontelescopic. The offset drive with the stabilizing knee-action caster actually exaggerates the shortness of the truck.

Check No. 9 on Reply Card for more Details

High Frequency Alternators

Voltage regulation of plus or minus 1 per cent and a low slip induction motor component to keep frequency within plus or minus 1/2 per cent are features of a single or three-phase homopolar inductor alternator with electronic exciter regulator, made by American Electric Motors, Inc., 4811 Telegraph Rd., Los Angeles 22, Calif. Used as a power supply for electronic equipment such as x-ray, calculators, induction heating, etc. and for motor drives on high speed machine tools and instruments, the alternator is available in sizes up to 10 kw with frequencies up to 1500 cycles. It is offered either as self-ventilated or water-cooled.

Check No. 10 on Reply Card for more Details

Reduces Coil Handling Time

Savings in time in loading and unloading coils is realized from the design of the model SRF-654 stock reel, offered by U. S. Tool Co. Inc., Ampere, N. J. With its collapsible forks, all the operator does is lay the forks over to allow for unloading the coil and then snap them in place for operation.

Reel is adjustable to any angle to suit the press. Needle and thrust bearings permit free rotation of spindle. Provision for desired amount of tension to produce drag is incorporated in the design. Core diameters are adjustable. Reels will accommodate stock up to 6 inches wide and coils with inside diameters from 8⅛ to 28 inches and outside diameters from 34 to 54 inches.

Check No. 11 on Reply Card for more Details

Sheave Has Adjustable Diameter

Easy mounting and dismounting is an advantage derived from the use of an adjustable diameter V-belt sheave with taper bushing and taper sleeve on which the flanges are mounted, made by American Pulley Co., 4200 Wissahickon Ave., Philadelphia 29, Pa. The double-taper hub feature is designed to rigidly lock the unit into a single solid sheave, thereby eliminating vibration, wear and fretting corrosion.

The split-taper bushing assures

keeps automatics well-fed…

FOLLANSBEE COLD ROLLED STRIP provides a continuous supply of uniform steel feeding from coils right into your automatics—regardless of the forming operation involved. Follansbee Cold Rolled Strip is a productioneer's tool. This Follansbee Specialty Steel in coils offers many time-saving advantages.

making furniture of fashion

FOLLANSBEE COLD ROLLED STRIP is a custom-made steel suitable for furniture manufacturing and a myriad other uses. Follansbee Cold Rolled Strip in coils is available in tempers and finishes for most industrial cold rolled steel requirements. Follansbee Cold Rolled Strip and Follansbee Polished Blue Strip are furnished in continuous coils to your specifications. You should be taking advantage of the custom-service on Follansbee Specialty Steels—call the Follansbee Representative nearby.

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"Bah! SQUINTING again, Plunkett!"

Squinting *at your market? Why be satisfied with a mere keyhole view? Unlock the door with* pre-coated *THOMAS STRIP and step through to scan your potential market from horizon to horizon. It may be much broader than you think!*

★ ★ ★

For your start toward capturing this broader market, take a long look at the sales and cost advantages today's better-than-ever BRASS COATED THOMAS STRIP offers.

To help you *upgrade your products*—quality-wise, design-wise, otherwise—and to help you *cut unit costs,* we now can furnish BRASS COATED THOMAS STRIP *up to 20-inches wide,* in gauges .010 to .035. Through improved production facilities, this tight brass coating—unitized with a steel base of controlled metallurgy—now is even more generous than ever . . . better able to stand up under severe fabrication without cracking, peeling or flaking!

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Available natural, planished and buffed, BRASS COATED THOMAS STRIP can serve equally well as your final product finish and as a prepared base for further plating. And, for long-lasting protection, lighter gauges in widths up to 7½-inches can be furnished already coated with clear lacquer.

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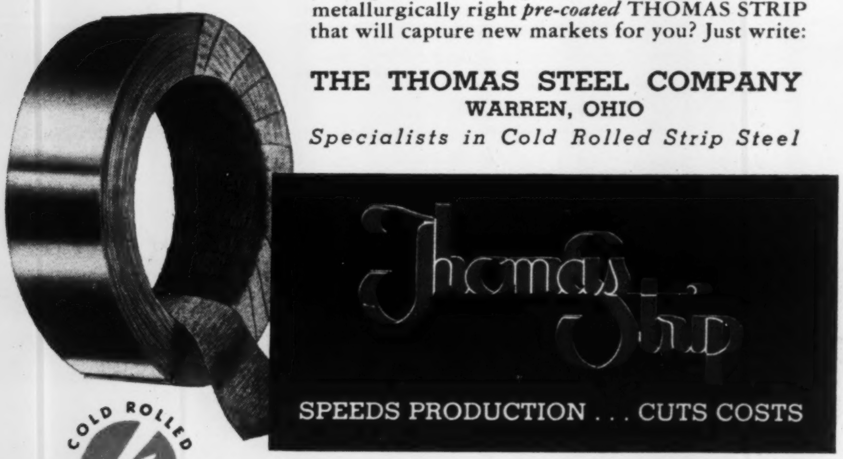

COLD ROLLED STRIP STEEL

Electrocoated with Chromium, Nickel, Brass, Copper and Zinc • Hot Dipped Tin and Lead Alloy • Lacquer Coated in Colors • Annealed Spring Steel • Alloy Strip Steel • Uncoated Strip Steel • Produced to Your Specifications.

positive clamping action on the shaft, whether oversized or undersized, and quick breakaway when dismounting. The simultaneous movement of all flanges when settings are changed maintains V-belt alignment. Sheave is available for most standard and wide-range adjustable diameter drives.

Check No. 12 on Reply Card for more Details

Small Parts Blast Cabinet

W. W. Sly Mfg. Co., 4700 Train Ave., Cleveland 2, O., is making a bench blast cabinet for abrasive blast cleaning of small parts. Operating on compressed air supplied by a standard 5 hp, 2-stage garage compressor, the unit has a ventilating fan which draws off the dust which is retained in a removable filter bag.

Operator loads the parts through a top hinged cover and observes the work through a window in the cover. His hands in rubber gloves rotate the work in the blast stream. Vision during blasting is provided by a side-mounted light. Cabinet requires bench space of 14 x 18 inches.

Check No. 13 on Reply Card for more Details

• • •

WELDING TRANSFORMER: Model 400E, a new 400 amp welding transformer is introduced by A. O. Smith Corp., Milwaukee 1, Wis. It has a welding range of 70 to 585 amp. Fan motor and capacitors are easily accessible for maintenance through a hinged door at front of the unit.

Check No. 14 on Reply Card for more Details

RECYCLING TIMERS: Designed to repeat definite electrical on and off time cycles, electrical cam recycling

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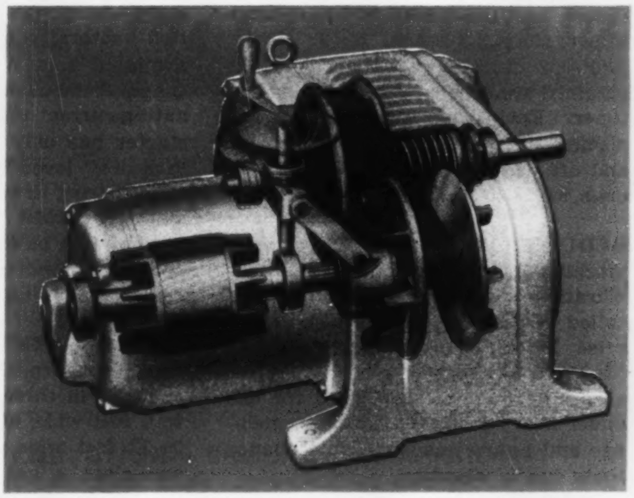

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You can diminish or increase the speed of your machines to the exact rpm required for top production by installing the U. S. Varidrive Motor. It's the original all-in-one unit that eliminates cone pulleys, gear-changing contraptions or extraneous speed changers. A convenient control handle is operated for instant change from speed to speed. You'll get more production and synchronize the speed to the operator's ability. The improved U. S. Varidrive embodies the new Autotaut belt tensioner which counterbalances varying loads so that no slippage occurs.

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timers are announced by Industrial Timer Corp., Newark, N. J. Fifty different overall time cycles can be obtained from one I. T. C. series CM timer. Each cycle is capable of furnishing up to 98 per cent length on and off periods.

Check No. 15 on Reply Card for more Details

REDUCED VIBRATION: An Empco machine leveling jack that features vibration absorbing mounting pads called Vi-Sorb is introduced by Enterprise Machine Parts Corp., Detroit 12, Mich. Vi-Sorb is a new vibration absorbing material developed for use under heavy loads to eliminate creepage and reduce machine maintenance costs due to vibration.

Check No. 16 on Reply Card for more Details

HEADREST: A headrest goggle for gas welders, cutters, burners, brazers and furnace men is announced by American Optical Co., Southbridge, Mass. The "free-floating" headgear has been adapted for use on the goggle. A slight twist of a knob adjusts goggle to wearer's head size. It may be worn over eyes or personal glasses.

Check No. 17 on Reply Card for more Details

DUAL FUEL BURNERS: Two new sizes have been added to the line of series 225 dual fuel burners made by North American Mfg. Co., Cleveland 5, O. These are combination gas-oil burners designed for applications such as forging, heat treating, smelting, kiln and drier firing with light or heavy oils and low pressure air as well as gas of any Btu content. Burners are available in 1¼, 2 and 3-inch sizes.

Check No. 18 on Reply Card for more Details

FOREMAN'S DESKS: Three standard models of new and improved Hallowell foreman's desks are introduced by Standard Pressed Steel Co., Jenkintown, Pa. Of all steel construction with baked-on enamel finish, desks have smooth, firm writing surfaces.

Check No. 19 on Reply Card for more Details

HOLDS THREADED PARTS IN POSITION: Security Locknut Corp., Chicago 39, Ill., announces the Studloc which holds threaded parts in any position, may be adjusted to any position and applied repeatedly without distortion or loss of locking charactertistics. The retainer floats in a counterbore and carries no load.

Check No. 20 on Reply Card for more Details

STARTER: Designed for either across-the-line starting of squirrel cage induction motors, or as a primary switch for wound rotor induction motors, the Life-Linestarter is available from Westinghouse Electric Corp., Pittsburgh 30, Pa. The alternating current magnetic, nonreversing starter has only one moving part, a "see-saw" lever balanced on a knife-edge bearing or center fulcrum. Available in NEMA sizes 0 through 4, the unit can be applied to all integral horsepower motors up to 100 hp.

Check No. 21 on Reply Card for more Details

OPENS GATE: Robot Appliances Inc., Dearborn, Mich., offers a gate operator in three sizes: For gates up to 6 feet wide, 6 to 8 feet wide and 8 to 12 feet wide. The unit will open and close a gate by the company's magnetic remote control, by the driver touching a button on the dashboard while the vehicle is in motion.

Check No. 22 on Reply Card for more Details

PAINT IN STICK FORM: Lacquer-Stik, a semisolidified paint in stick form, was developed by Lake Chemical Co., Chicago 12, Ill., for wipe-ons or fill-ins of stamped, engraved or etched markings and designs on all types of smooth surface materials. Stick is rubbed over the impression and surface residue is wiped off. Imbedded paint hardens quickly.

Check No. 23 on Reply Card for more Details

MARKS METAL PLATES: A new hand stamping fixture for marking metal name plates is announced by M. E. Cunningham Co., Pittsburgh 19, Pa. Designated as model SF-100, the tool is made from the company's Mecco safety steel to prevent spalling and mushrooming. It can be fabricated to order for processing one or a group of plates or other metal objects.

Check No. 24 on Reply Card for more Details

V-BELTS: Incorporating a chemically produced fiber of high strength, low stretch and excellent shock absorbing qualities is the new line of Hy-T v-belts introduced by Goodyear Tire & Rubber Co., Akron, O. Other qualities include inherent resistance to shrinking, water and mildew.

Check No. 25 on Reply Card for more Details

PORTABLE LADDER: A new portable ladder, announced by Atlas Industrial Co., Brooklyn 32, N. Y., will extend from 4 to 24 feet and is equipped with a safe working platform. It has extra bearing plates and leveling screws for use in soft and uneven earth.

Check No. 26 on Reply Card for more Details

DESTROYS RUST: Liquid primer R-10-X, marketed by Thompson-Long Co., Chicago 4, Ill., is a rust destroyer that contains selenium, which combines with ferric oxide by chemical action. The resulting compound dries quickly into a hard, dense substance which is impervious to moisture and holds paint. Primer penetrates metal's pores and neutralizes all rust.

Check No. 27 on Reply Card for more Details

IMPROVED ELECTRODE: A new improved arc welding electrode, the W-52 (AWS class E7010), a reverse polarity direct current rod is announced by General Electric's Apparatus Department, Schenectady 5, N. Y. The carbon molybdenum electrode, available in 5/32 and 3/16-inch diameters, is designed for high quality welding of low alloy, high tensile steels.

Check No. 28 on Reply Card for more Details

WITHSTANDS 1200° F HEAT: Formulated to protect metals subject to temperatures ranging from 500 to 1200° F, a new aluminum paint introduced by Thompson & Co., Oakmont, Pa., can be applied like ordinary paint and requires no primer. Called Tecosteel, it air dries in 12 to 18 hours or can be baked dry at 350° F in 15 minutes. It can be brushed, sprayed or dipped.

Check No. 29 on Reply Card for more Details

ELECTRONIC TIMER: Recommended for process control and machine timing when long life, repeat cycle operation or precise accuracy is desired, is the electronic timer series 30, made by Photoswitch Inc., Cambridge 42, Mass. It may be used to control such equipment as drilling machines, automatic filling machines, spot welders, grinders and honing machines.

Check No. 30 on Reply Card for more Details

FLEXIBLE TUBING: Spiratube, an improved type of lightweight, flexible tubing, is announced by Flexible Tubing Corp., Branford, Conn. It is wear and heat resistant, portable, retractable and easy to assemble. Available in a variety of standard plys and materials, tubing is designed for most ducting requirements from 3 to 30 inches ID for air and other gases, powdered, granular or other light solids.

Check No. 31 on Reply Card for more Details

FOR MORE INFORMATION
on the new products and equipment
in this section, fill in a card.
It will receive prompt attention.

Market Summary

RISING capital goods expenditures are intensifying tight steel supply conditions. Continued strong demand for sheets, strip, tin plate and pipe is being supplemented by expanding requirements for bars, plates and structurals. Heavy product deliveries are becoming increasingly extended. Supply stringency in these items in no way compares with that in the light, flat-rolled classifications. But some trade authorities foresee acute shortages developing in this area as delivery pressure mounts under impact of new capital equipment programs.

DEMAND— Placing of 10,000 freight cars by the Equitable Life Assurance Society for lease to the Pennsylvania Railroad highlights market developments. This is said to be the largest car order, in point of dollars, on record. Investment of $53 million is involved. Approximately 245,000 tons of steel, chiefly heavy products, will be required. Generally, consumer pressure for steel in all classifications is increasing. Even alloys, relatively sluggish recently, are more active. Automotive needs show no sign of subsiding. Miscellaneous manufacturing requirements are unsatisfied with producers turning away business or offering only relatively distant deliveries. No relief appears in early prospect barring order cancellations or shipment holdups stemming from prolonged automotive labor trouble. This is especially true with vacation curtailments just ahead.

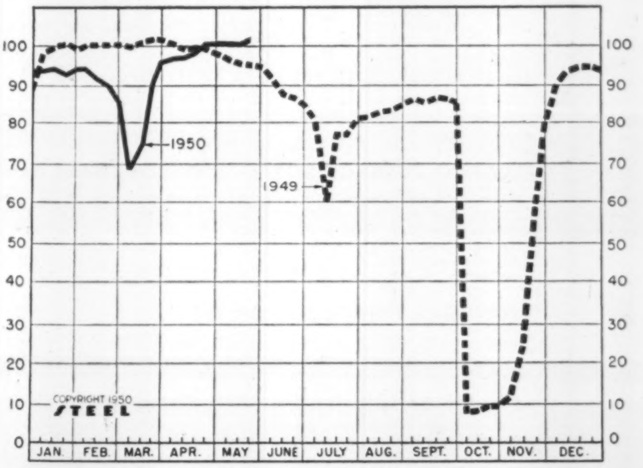
SUPPLIES— Intensification of supply troubles is expected when the carbuilders begin to specify their requirements for the Equitable car program. Current extended deliveries in plates, structurals and bars, in part, stem from inadequate supplies of raw steel. Strike-created production losses, coupled with record demand for sheets and strip, are being acutely felt by the finishing mills which are dependent upon semifinished steel supplies allocated to meet the requirements for the various finished products. There just isn't enough semifinished to keep all the mills busy all of the time. Further, a large part of plate output is going to production of large diameter pipe. On top of that several producers are no longer accepting plate tonnage for rolling on conventional sheet mills. This leaves a large supply gap which other producers may not be able to bridge. Sheetmakers are not accepting new business for delivery before fourth quarter. Consumers are turning increasingly to the conversion market for relief.

PRODUCTION— Steel mills turned out record tonnage last week, operating at 101 per cent of capacity, up ½ point from the preceding week. This is equivalent to about 1,925,000 tons. District rates rose 7 points to 87 per cent in St. Louis, 2.5 points to 106.5 in Wheeling, 1 point to 98 in eastern Pennsylvania, 1 point to 96.5 in Cleveland. Operations declined 3 points to 103 in Cincinnati and 84 in New England.

PRICES— Stability in finished steel prices, prevailing since early in the year, continues. Only minor changes are noted. Last week Carnegie-Illinois Steel Corp. and Acme Steel Co. followed the move of other producers and cut the mill price and raised extras on tight cooperage hoop. Another change in the week was an advance by Colorado Fuel & Iron Corp. on annealed stone and galvanized stone wire. The scrap market is in feverish state with brokers bidding up prices sharply. Scattered mill purchases are an important factor in the current scrap rise, especially purchases on conversion account. The speculative factor also is present.

COMPOSITES— STEEL's composite for steelmaking scrap advanced to $33.83 from $31.67 the preceding week and compares with $21.67 a year ago. Finished steel indexes are steady, the weighted index holding at 156.13 and the arithmetical composite at $93.23. Pig iron composites are unchanged with No. 2 foundry, $46.47, basic, $45.97 and malleable, $47.27.

NATIONAL STEELWORKS OPERATIONS



DISTRICT INGOT RATES

Percentage of Capacity Engaged at Leading Production Points

	Week Ended May 20	Change	Same Week 1949	Same Week 1948
Pittsburgh	100.5	0*	94	96
Chicago	104	0	99	93.5
Eastern Pa.	98	+ 1	92	88
Youngstown	107	0	105	103
Wheeling	106.5	+ 2.5	86	97.5
Cleveland	96.5	+ 1*	101	96.5
Buffalo	104	0	97.5	93
Birmingham	100	0	100	100
New England	84	— 3	66	79
Cincinnati	103	— 3	96	106
St. Louis	87	+ 7	75.5	84
Detroit	102	0	70	100
Western	95.5	0	92	..
Estimated national rate	101	+ 0.5	95	95

Based on weekly steelmaking capacity of 1,906,267 net tons for 1950; 1,843,516 net tons for 1949; 1,802,476 net tons for 1948.

*Change from revised rate.

News Summary—p. 43   Production-Engineering News—p. 73

Composite Market Averages

	May 18 1950	Week Ago	Month Ago	Year Ago	5 Yrs. Ago
FINISHED STEEL INDEX, Weighted:					
Index (1935-39 av.=100)	156.13	156.13	156.13	152.90	101.10
Index in cents per lb....	4.230	4.230	4.230	4.142	2.739
ARITHMETICAL PRICE COMPOSITES:					
Finished Steel, NT	$93.23	$93.23	$93.18	$93.55	$57.55
No. 2 Fdry. Pig Iron, GT	46.47	46.47	46.47	46.07	24.67
Basic Pig Iron, GT	45.97	45.97	45.97	45.60	24.00
Malleable Pig Iron, GT..	47.27	47.27	47.27	47.27	25.29
Steelmaking Scrap, GT..	33.83	31.67	29.50	21.67	19.17

Weighted finished steel index based on average shipments and prices of the following 14 representative products during 5-year base period 1935-39: Structural shapes, plates, rails, hot-rolled and cold-finished bars, pipe, wire, nails, tin plate, hot and cold-rolled sheets, galvanized sheets, hot and cold-rolled strip. For complete explanation see STEEL, Sept. 19, 1949, p. 54.

Arithmetical steel price composite based on same products as the weighted finished steel index with the exception of rails, cold-finished bars, galvanized sheets and hot-rolled strip.

Basic and No. 2 foundry pig iron composites are based on average prices at Pittsburgh, Bethlehem, Birmingham, Buffalo, Chicago, Cleveland, Granite City, Youngstown. Malleable composite based on same points, except Birmingham.

Steelmaking scrap composite based on average prices of No. 1 heavy melting steel at Pittsburgh, Chicago and Philadelphia.

Comparison of Prices

Comparative prices by districts, in cents per pound except as otherwise noted. Delivered prices based on nearest production point.

FINISHED MATERIALS

	May 18 1950	Week Ago	Month Ago	Year Ago	5 Yrs. Ago
Bars,H.R., Pittsburgh	3.45	3.45	3.45	3.35	2.15
Bars, H.R., Chicago	3.45	3.45	3.45	3.35	2.15
Bars, C.F., Pittsburgh	4.10–15	4.10–15	4.10–15	3.95-4.00	2.65
Shapes, Std., Pittsburgh ..	3.40	3.40	3.40	3.25	2.10
Shapes, Std., Chicago	3.40	3.40	3.40	3.25	2.10
Plates, Pittsburgh	3.50	3.50	3.50	3.40	2.20
Plates, Chicago	3.50	3.50	3.50	3.40	2.20
Plates, Coatesville, Pa. ..	3.60	3.60	3.60	3.50	2.20
Plates, Sparrows Point, Md.	3.50	3.50	3.50	3.45	2.20
Plates, Claymont, Del. ...	3.60	3.60	3.60	3.65	2.20
Sheets, H.R., Pittsburgh..	3.35	3.35	3.35	3.25	2.20
Sheets, H.R., Chicago ...	3.35	3.35	3.35	3.25	2.20
Sheets, C.R., Pittsburgh ..	4.10	4.10	4.10	4.00	3.05
Sheets, C.R., Chicago	4.10	4.10	4.10	4.00	3.05
Sheets, C.R., Detroit	4.30	4.30	4.30	4.20	3.15
Sheets, Galv., Pittsburgh..	4.40	4.40	4.40	4.40	3.65
Strip, H.R., Pittsburgh ...	3.25	3.25	3.25	3.25	2.10
Strip, H.R., Chicago	3.25	3.25	3.25	3.25	2.10
Strip, C.R., Pittsburgh ...	4.15	4.15	4.15	4.00–75	2.80
Strip, C.R., Chicago	4.30	4.30	4.30	4.00–15	2.90
Strip, C.R., Detroit	4.35–40	4.35–40	4.35–40	4.20–50	2.90
Wire, Basic, Pittsburgh ..	4.50	4.50	4.50	4.15	2.60
Nails, Wire, Pittsburgh...	5.30	5.30	5.30	5.15	2.80
Tin plate, box, Pittsburgh.	$7.50	$7.50	$7.50	$7.75	$5.00

SEMIFINISHED

	May 18 1950	Week Ago	Month Ago	Year Ago	5 Yrs. Ago
Billets, forging, Pitts. (NT)	$63.00	$63.00	$63.00	$61.00	$40.00
Sheet bar, mill (NT)	57.00–58.00	57.00–58.00	57.00–58.00	67.00	34.00
Wire rods, $\frac{7}{32}$-$\frac{5}{8}$", Pitts...	3.85	3.85	3.85	3.775	2.00

PIG IRON, Gross Ton

	May 18 1950	Week Ago	Month Ago	Year Ago	5 Yrs. Ago
Bessemer, Pitts.	$47.00	$47.00	$47.00	$47.00	$25.50
Basic, Valley	46.00	46.00	46.00	46.00	24.50
Basic, del. Phila.	49.44	49.44	49.44	49.39	26.34
No. 2 Fdry, Pitts.	46.50	46.50	46.50	46.50	25.00
No. 2 Fdry, Chicago	46.50	46.50	46.50	46.25	25.00
No. 2 Fdry, Valley	46.50	46.50	46.50	46.50	25.00
No. 2 Fdry, del. Phila. ...	49.94	49.94	49.94	49.89	26.84
No. 2 Fdry, Birm.	42.38	42.38	42.38	39.38	21.38
No. 2 Fdry. (Birm.)del.Cin.	49.08	49.08	49.08	45.43	25.06
Malleable, Valley	46.50	46.50	46.50	46.50	25.00
Malleable, Chicago	46.50	46.50	46.50	46.50	25.00
Charcoal, Lyles, Tenn. ...	60.00	60.00	60.00	66.00	33.00
Ferromanganese, Etna, Pa.	175.00	175.00	175.00	175.00	140.33*

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* Delivered, Pittsburgh.

SCRAP, Gross Ton

	May 18 1950	Week Ago	Month Ago	Year Ago	5 Yrs. Ago
No. 1 Heavy Melt. Pitts...	$38.00	$36.00	$33.00	$23.00	$20.00
No. 1 Heavy Melt. E. Pa..	29.00	28.50	26.00	21.50	18.50
No. 1 Heavy Melt. Chicago	34.50	30.50	29.50	20.50	18.75
No. 1 Heavy Melt. Valley.	37.75	35.25	33.75	22.00	20.00
No. 1 Heavy Melt. Cleve..	34.25	31.75	30.25	18.50	19.50
No. 1 Heavy Melt. Buffalo.	31.75	29.75	29.75	22.25	19.25
Rails, Rerolling, Chicago..	48.50	48.50	46.50	27.75	22.25
No. 1 Cast, Chicago	42.50	42.50	42.50	27.50	20.00

COKE, Net Ton

	May 18 1950	Week Ago	Month Ago	Year Ago	5 Yrs. Ago
Beehive, Furn., Connlsvl...	$14.25	$14.25	$14.25	$14.25	$7.00
Beehive, Fdry., Connlsvl...	16.00	16.00	16.00	16.75	7.75
Oven Fdry., Chicago	21.00	21.00	21.00	20.40	13.35

NONFERROUS METALS

	May 18 1950	Week Ago	Month Ago	Year Ago	5 Yrs. Ago
Copper, del. Conn.	20.50	19.50	19.50	18.00	12.00
Zinc, E. St. Louis	12.00	12.00	10.50	12.00	8.25
Lead, St. Louis	11.80	11.80	10.30	14.375	6.35
Tin, New York	77.50	77.625	76.75	103.00	52.00
Aluminum, del.	17.00	17.00	17.00	17.00	15.00
Antimony, Laredo, Tex. ..	24.50	24.50	24.50	38.50	14.50
Nickel, refinery, duty paid.	40.00	40.00	40.00	40.00	35.00

Pig Iron

For key to producing companies, turn next page.
Minimum delivered prices do not include 3% federal tax.

PIG IRON, Gross Ton

	Basic	No. 2 Foundry	Malleable	Bessemer
Bethlehem,Pa. B2	$48.00	$48.50	$49.00	$49.50
Newark,del.	50.63	51.13	51.63	52.13
Brooklyn,N.Y.,del.	....	52.79	53.29	....
Birmingham District				
Birmingham R2	41.88	42.38	....	....
Birmingham S9	41.88	42.38	....	....
Woodward,Ala. W15	41.88	42.38	....	....
Cincinnati,del.	....	49.08	....	....
Buffalo District				
Buffalo H1, R2	46.00	46.50	47.00	....
Tonawanda,N.Y., W12	46.00	46.50	47.00	....
N.Tonawanda,N.Y., T9	....	46.50	47.00	....
Boston, del.	55.26	55.76	56.20	....
Rochester,N.Y.,del.	48.63	49.13	49.63	....
Syracuse,N.Y.,del.	49.58	50.08	50.58	....
Chicago District				
Chicago I-3	46.00	46.50	46.50	47.00
Gary,Ind. C3	46.00	....	46.50	....
IndianaHarbor,Ind. I-2	46.00	....	46.50	....
So.Chicago,Ill. W14 Y1	46.00	46.50	46.50	....
So.Chicago,Ill. C3	46.00	....	46.50	47.00
Milwaukee, del.	47.89	48.39	48.39	48.89
Muskegon,Mich.,del.	....	51.98	51.98	....
Cleveland District				
Cleveland A7	46.00	46.50	46.50	47.00
Cleveland R2	46.00	46.50	46.50	....
Akron,del. from Cleve.	48.39	48.89	48.89	49.39
Lorain,O. N3	46.00	....	....	47.00
Duluth I-3	....	....	46.50	....
Erie,Pa. I-3	46.00	46.50	46.50	47.00
Everett,Mass. E1	....	50.50	51.00	....
Fontana,Calif. K1	52.00	52.50	....	....
Geneva,Utah G1	46.00	46.50	....	....
Seattle, Tacoma,Wash.,del.	....	54.20	....	....
Portland,Oreg.,del.	....	54.20	....	....
LosAngeles,SanFrancisco,del. ...	53.70	54.20	....	....
GraniteCity,Ill. M10	47.90	48.40	48.90	....
St.Louis,del. (incl. tax)	48.65	49.15	49.65	....
Ironton, Utah C11	46.00	46.50	....	....
Minnequa,Colo. C10	47.00	47.50	47.50	....
Pittsburgh District				
NevilleIsland,Pa. P6	46.00	46.50	46.50	47.00
Pitts,N.&S. sides, Ambridge, Aliquippa,del.	47.19	47.69	47.69	48.19
McKeesRocks,del.	46.95	47.45	47.45	47.95
Lawrenceville,Homestead, McKeesport,Monaca,del.	47.44	47.94	47.94	48.44
Verona,del.	47.90	48.40	48.40	48.90
Brackenridge,del.	48.13	48.63	48.63	49.13
Bessemer,Pa. C3	46.00	....	46.50	47.00
Clairton,Rankin,So.Duquesne,Pa. C3	46.00	....	....	....
McKeesport,Pa. N3	46.00	....	....	47.00
Sharpsville,Pa. S6	46.00	46.50	46.50	47.00
Steelton,Pa. B2	48.00	48.50	49.00	49.50
Steubenville,O. W10	46.00	....	....	....
Struthers,O. S16	46.00	....	....	....
Swedeland,Pa. A3	48.00	48.50	49.00	49.50
Philadelphia,del.	49.44	49.94	50.44	50.94
Toledo,O. I-3	46.00	46.50	46.50	47.00
Cincinnati,del.	51.01	51.51	....	....
Troy,N.Y., R2	48.00	48.50	49.00	49.50
Youngstown District				
Hubbard,O. Y1	46.00	46.50	46.50	....
Youngstown C3	46.00	....	....	47.00
Youngstown Y1	46.00	46.50	46.50	47.00
Mansfield,O. del.	50.26	50.76	50.76	51.26

PIG IRON DIFFERENTIALS

Silicon: Add 50 cents per ton for each 0.25% Si over base grade, 1.75-2.25%.

Phosphorous: Deduct 38 cents per ton for P content of 0.70% and over.

Manganese: Add 50 cents per ton for each 0.50% manganese over 1%, or portion thereof.

Nickel: Under 0.50% no extra; 0.50-0.74%, incl., add $2 per ton and each additional 0.25%, add $1 per ton.

BLAST FURNACE SILVERY PIG IRON, Gross Ton

(Base 6.00-6.50% silicon; add $1 for each 0.5% Si to 11.50%)

Jackson,O. G2, J1	$57.00
Buffalo H1	58.25

ELECTRIC FURNACE SILVERY PIG IRON, Gross Ton

(Base 14.01-14.50% silicon; add $1 for each 0.5% Si to 18%; $1 for each 0.5% Mn over 1%; $1 for 0.045% max. P)

NiagaraFalls,N.Y. P15	$71.50
Keokuk, Iowa, Openhearth & Fdry, frt. allowed K2	77.00
Keokuk, Iowa, OH & Fdry., 12½ lb. piglets, frt. allowed K2..	82.00
Wenatchee, Wash., OH & Fdry, frt. allowed K2	77.00

CHARCOAL PIG IRON, Gross Ton

(Low phos. semi-cold blast; differential charged from silicon over base grade; also for hard chilling iron Nos. 5 x 6)

Lyles,Tenn. T3	$60.00

LOW PHOSPHOROUS PIG IRON, Gross Ton

Cleveland, intermediate, A7	$51.00
Steelton,Pa. B2	54.00
Philadelphia delivered	57.00
Troy,N.Y. R2	54.00

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Semifinished and Finished Steel Products

Mill prices as reported to STEEL, May 18, 1950; cents per pound except as otherwise noted. Changes shown in italics.
Code numbers following mill points indicate producing company; key on next two pages.

INGOTS, Carbon, Forging (NT)

Detroit R7	$50.00
Munhall,Pa. C3	50.00

INGOTS, Alloy (NT)

Detroit R7	$51.00
Houston,Tex. S5	59.00
Midland,Pa. C18	51.00
Munhall,Pa. C3	51.00
So.Duquesne,Pa. C3	51.00

BILLETS, BLOOMS & Slabs

Carbon, Rerolling (NT)

Bessemer,Pa. C3	$53.00
Clairton,Pa. C3	53.00
Conshohocken,Pa. A3	58.00
Ensley,Ala. T2	53.00
Fairfield,Ala. T2	53.00
Fontana,Cal. K1	72.00
Gary,Ind. C3	53.00
Johnstown,Pa. B2	53.00
Lackawanna,N.Y. B2	53.00
Munhall,Pa. C3	53.00
Sharon,Pa. S3	57.00
So.Chicago,Ill. C3	53.00
So.Duquesne,Pa. C3	53.00

Carbon, Forging (NT)

Bessemer,Pa. C3	$63.00
Buffalo R2	63.00
Canton,O. R2	63.00
Clairton,Pa. C3	63.00
Cleveland R2	63.00
Conshohocken,Pa. A3	65.00
Detroit R7	63.00
Ensley,Ala. T2	63.00
Fairfield,Ala. T2	63.00
Fontana,Calif. K1	85.00
Gary,Ind. C3	63.00
Geneva,Utah G1	63.00
Houston,Tex. S5	71.00
Ind.Harbor,Ind. I-2	63.00
Johnstown,Pa. B2	63.00
Lackawanna,N.Y. B2	63.00
Los Angeles B3	82.00
Munhall,Pa. C3	63.00
Seattle B3	82.00
So.Chicago C3,R2,W14	63.00
So.Duquesne,Pa. C3	63.00
So.SanFrancisco B3	82.00
Warren,O. C17	63.00

Alloy (NT)

Bethlehem,Pa. B2	$66.00
Buffalo R2	66.00
Canton, O. R2, T7	66.00
Conshohocken,Pa. A3	68.00
Detroit R7	66.00
Fontana,Calif. K1	85.00
Gary,Ind. C3	66.00
Houston,Tex. S5	74.00
Ind.Harbor,Ind. Y1	66.00
Johnstown,Pa. B2	66.00
Lackawanna,N.Y. B2	66.00
LosAngeles B3	86.00
Massillon,O. R2	66.00
Midland,Pa. C18	66.00
Munhall,Pa. C3	66.00
Sharon,Pa. S3	66.00
So.Chicago C3,R2,W14	66.00
So.Duquesne,Pa. C3	66.00
Warren,O. C17	66.00
Youngstown Y1	66.00

SHEETS BARS (NT)

Mansfield,O. E6	$58.00
Sharon,Pa. S3	57.00

ROUNDS, SEAMLESS TUBE (NT)

Canton,O. R2	$76.00
Cleveland R2	76.00
Ind.Harbor,Ind. I-2	76.00
Massillon,O. R2	76.00
So.Chicago,Ill. R2	76.00

SKELP

Aliquippa,Pa. J5	3.25
Munhall,Pa. C3	3.15
Warren,O. R2	3.15
Youngstown C3, R2	3.15

WIRE RODS

AlabamaCity,Ala. R2	3.85
Buffalo W12	3.85
Cleveland A7	3.85
Donora,Pa. A7	3.85
Fairfield,Ala. T2	3.85
Houston,Tex. S5	4.25
Ind.Harbor,Ind. Y1	3.85
Johnstown,Pa. B2	3.85
Joliet,Ill. A7	3.85
LosAngeles B3	4.65
Minnequa,Colo. C10	4.10
Monessen,Pa. P7	3.85
No.Tonawanda,N.Y. B11	4.10
Pittsburg,Calif. C11	4.50
Portsmouth,O. P12	3.85
Roebling,N.J. R5	3.95
So.Chicago,Ill. R2	3.85
SparrowsPoint B2	3.95
Sterling,Ill.(1) N15	3.85
Struthers,O. Y1	3.85
Torrance,Calif. C11	4.65

STRUCTURALS

Carbon Steel Stand. Shapes

Aliquippa,Pa. J5	3.40
Bessemer,Ala. T2	3.40
Bethlehem,Pa. B2	3.45
Clairton,Pa. C3	3.40
Fairfield,Ala. T2	3.40
Fontana,Calif. K1	4.00
Gary,Ind. C3	3.40
Geneva,Utah G1	3.40
Houston, Tex. S5	3.80
Ind.Harbor,Ind. I-2	3.40
Johnstown,Pa. B2	3.45
KansasCity,Mo. S5	4.00
Lackawanna,N.Y. B2	3.45
LosAngeles B3	4.00
Minnequa,Colo. C10	3.75
Munhall,Pa. C3	3.40
Niles,Calif.(22) P1	4.02
Phoenixville,Pa. P4	3.30
Portland,Oreg. O4	3.90
Seattle B3	4.05
So.Chicago,Ill. C3, W14	3.40
So.SanFrancisco B3	3.95
Torrance,Calif. C11	4.00
Weirton,W.Va. W6	3.40

Alloy Stand. Shapes

Clairton,Pa. C3	4.05
Fontana,Calif. K1	5.25
Munhall,Pa. C3	4.05
So.Chicago,Ill. C3	4.05

H.-S. Low-Alloy Stand. Shapes

Aliquippa,Pa. J5	5.15
Bessemer,Ala. T2	5.15
Bethlehem,Pa.(14) B2	5.20
Clairton,Pa. C3	5.15
Fairfield,Ala T2	5.15
Fontana,Calif. K1	5.75
Gary,Ind. C3	5.15
Ind.Harbor,Ind. I-2, Y1	5.15
Johnstown,Pa. B2	5.20
Lackawanna,N.Y.(14)B2	5.20
Munhall,Pa. C3	5.15
So.Chicago,Ill. C3	5.15
Struthers,O. Y1	5.15

Wide Flange

Bethlehem,Pa. B2	3.45
Lackawanna,N.Y. B2	3.45
Munhall,Pa. C3	3.40
So.Chicago,Ill. C3	3.40

H.-S., L-A Wide Flange

Munhall,Pa. C3	5.10
So.Chicago,Ill. C3	5.10

SHEET STEEL PILING

Ind.Harbor,Ind. I-2	4.20
Lackawanna,N.Y. B2	4.20
Munhall,Pa. C3	4.20
So.Chicago,Ill. C3	4.20
Weirton,W.Va. W6	4.20

PLATES, Carbon Steel

AlabamaCity,Ala. R2	3.50
Aliquippa,Pa. J5	3.50
Ashland,Ky.(15) A10	3.50
Bessemer,Ala. T2	3.50
Clairton,Pa. C3	3.50
Claymont,Del. W16	3.60
Cleveland J5, R2	3.50
Coatesville,Pa. L7	3.60
Conshohocken,Pa. A3	3.60
Ecorse,Mich. G5	3.75
Fairfield,Ala. T2	3.50
Fontana,Calif. K1	4.10
Gary,Ind. C3	3.50
Geneva,Utah G1	3.50
Harrisburg,Pa. C5	3.50
Houston,Tex. S5	3.90
Ind.Harbor,Ind. I-2, Y1	3.50
Johnstown,Pa. B2	3.50
Lackawanna,N.Y. B2	3.50
Minnequa,Colo. C10	4.30
Munhall,Pa. C3	3.50
Pittsburgh J5	3.50
Seattle B3	4.40
Sharon,Pa. S3	3.50
So.Chicago,Ill. C3, W14	3.50
SparrowsPoint,Md. B2	3.50
Steubenville,O. W10	3.50
Warren,O. R2	3.50
Weirton,W.Va. W6	3.50
Youngstown C3, R2, Y1	3.50

PLATES (Universal Mill)

Fontana,Calif. K1	4.40

PLATES, Carbon A.R.

Fontana,Calif. K1	5.25

PLATES, Open-Hearth Alloy

Coatesville,Pa. L7	4.50
Conshohocken,Pa. A3	4.40
Fontana,Calif. K1	5.40
Gary,Ind. C3	4.40
Johnstown,Pa. B2	4.40
Munhall,Pa. C3	4.40
Sharon,Pa. S3	4.40
So.Chicago,Ill. C3	4.40
SparrowsPoint,Md. B2	4.40

PLATES, Wrought Iron

Economy,Pa. B14	7.85

PLATES,High-Strength Low-Alloy

Aliquippa,Pa. J5	5.35
Bessemer,Ala. T2	5.35
Clairton,Pa. C3	5.35
Cleveland J5, R2	5.35
Conshohocken,Pa. A3	5.35
Ecorse,Mich. G5	5.60
Fairfield,Ala. T2	5.35
Fontana,Calif. K1	5.95
Gary,Ind. C3	5.35
Geneva,Utah G1	5.35
Houston,Tex. S5	5.60
Ind.Harbor,Ind. I-2, Y1	5.35
Johnstown,Pa. B2	5.35
Munhall,Pa. C3	5.35
Pittsburgh J5	5.35
Sharon,Pa. S3	5.35
So.Chicago,Ill. C3	5.35
SparrowsPoint,Md. B2	5.35
Warren,O. R2	5.35
Youngstown Y1	5.35

FLOOR PLATES

Cleveland J5	4.55
Conshohocken,Pa. A3	4.55
Harrisburg,Pa. C5	4.55
Ind.Harbor,Ind. I-2	4.55
Munhall,Pa. C3	4.55
So.Chicago,Ill. C3	4.55

PLATES, Ingot Iron

Ashland,c.l.(15) A10	3.75
Ashland,lcl(15) A10	4.25
Cleveland,cl R2	4.10
Warren,O.cl R2	4.10

BARS, Hot-Rolled Carbon

AlabamaCity,Ala. R2	3.45
Aliquippa,Pa. J5	3.45
Alton,Ill.(1) L1	3.45
Ashland,Ky.(17) A10	3.45
Atlanta,Ga. A11	3.60
Bessemer,Ala. T2	3.45
Buffalo R2	3.45
Canton,O. R2	3.45
Clairton,Pa. C3	3.45
Cleveland R2	3.45
Ecorse,Mich. G5	3.65
Emeryville,Calif. J7	4.20
Fairfield,Ala. T2	3.45
Fontana,Calif. K1	4.10
Gary,Ind. C3	3.45
Houston,Tex. S5	3.85
Ind.Harbor,Ind. I-2, Y1	3.45
Johnstown,Pa. B2	3.45
KansasCity,Mo. S5	4.05
Lackawanna,N.Y. B2	3.45
Los Angeles B3	4.15
Midland,Pa. C18	3.45
Milton,Pa. B6	3.45
Minnequa,Colo. C10	3.85
Niles,Calif. P1	4.17
N.Tonawanda,N.Y. B11	3.45
Pittsburg,Calif. C11	4.15
Pittsburgh J5	3.45
Portland,Oreg. O4	4.20
Seattle B3, N14	4.20
So.Chicago C3, R2, W14	3.45
So.Duquesne,Pa. C3	3.45
S.SanFran.,Cal. B3	4.20
Struthers,O. Y1	3.45
Torrance,Calif. C11	4.15
Weirton,W.Va. W6	3.45
Youngstown C3, R2	3.45

BAR SIZE ANGLES; S. SHAPES

Aliquippa,Pa. J5	3.45
Atlanta A11	3.60
Johnstown,Pa. B2	3.45
Lackawanna,N.Y. B2	3.45
Niles,Calif. P1	4.17
Pittsburgh(23) J5	3.45
Portland,Oreg. O4	4.20
SanFrancisco S7	4.00
Weirton,W.Va. W6	3.45

BAR SIZE ANGLES; H.R.CARBON

Bethlehem,Pa. B2	3.65

BARS, Hot-Rolled Alloy

Bethlehem,Pa. B2	3.95
Buffalo R2	3.95
Canton,O. R2, T7	3.95
Clairton,Pa. C3	3.95
Ecorse,Mich. G5	4.25
Fontana,Calif. K1	4.95
Gary,Ind. C3	3.95
Houston,Tex. S5	4.35
Ind.Harbor,Ind. I-2, Y1	3.95
Johnstown,Pa. B2	3.95
KansasCity,Mo. S5	4.55
Lackawanna,N.Y. B2	3.95
Los Angeles B3	5.00
Massillon,O. R2	3.95
Midland,Pa. C18	3.95
So.Chicago C3, R2, W14	3.95
So.Duquesne,Pa. C3	3.95
Struthers,O. Y1	3.95
Warren,O. C17	3.95
Youngstown C3	3.95

BARS, Hot-Rolled Ingot Iron

Ashland,Ky.(17) A10	3.70

BARS & SMALL SHAPES, H.R., High-Strength Low-Alloy

Aliquippa,Pa. J5	5.20
Bessemer,Ala. T2	5.20
Bethlehem,Pa. B2	5.20
Clairton,Pa. C3	5.20
Cleveland R2	5.20
Ecorse,Mich. G5	5.40
Fairfield,Ala. T2	5.20
Fontana,Calif. K1	6.25
Gary,Ind. C3	5.20
Ind.Harbor,Ind. I-2, Y1	5.20
Johnstown,Pa. B2	5.20
Lackawanna,N.Y. B2	5.20
Pittsburgh J5	5.20
So.Duquesne,Pa. C3	5.20
Struthers,O. Y1	5.20
Youngstown C3	5.20

BARS, Cold-Finished Carbon

Aliquippa,Pa. K5	4.15
Ambridge,Pa. W18	4.15
BeaverFalls,Pa. M12,R2	4.15
Buffalo B5	4.15
Camden,N.J. P13	4.63
Carnegie,Pa. C12	4.15
Chicago W18	4.15
Cleveland A7, C20	4.15
Detroit P17	4.30
Donora,Pa. A7	4.15
Ecorse,Mich. G5	4.35
Elyria,O. W8	4.15
FranklinPark,Ill. N5	4.15
Gary,Ind. R2	4.15
Hammond,Ind. L2, M13	4.15
Hartford, Conn. R2	4.55
Harvey,Ill. B5	4.15
LosAngeles R2	5.55
Mansfield,Mass. B5	4.55
Massillon,O. R2, R8	4.15
Midland,Pa. C18	4.15
Monaca,Pa. S17	4.15
Newark,N.J. W18	4.55
Plymouth,Mich. P5	4.40
Pittsburgh J5	4.10
Putnam, Conn. W18	4.55
Readville,Mass. C14	4.55
St.Louis,Mo. M5	4.55
So.Chicago,Ill. W14	4.15
SpringCity,Pa.(5) K3	4.55
Struthers,O. Y1	4.15
Waukegan,Ill. A7	4.15
Youngstown F3, Y1	4.15

BARS, Cold-Finished Alloy

Aliquippa,Pa. K5	4.90
Ambridge,Pa. W18	4.90
BeaverFalls,Pa. M12	4.90
Bethlehem,Pa. B2	4.90
Buffalo B5	4.90
Canton,O. R2, T7	4.90
Carnegie,Pa. C12	4.90
Chicago W18	4.90
Cleveland A7, C20	4.90
Detroit P17	5.05
Donora,Pa. A7	4.90
Elyria,O. W8	4.90
Gary,Ind. R2	4.90
Hammond,Ind. L2, M13	4.90
Hartford,Conn. R2	5.20
Harvey,Ill. B5	4.90
Lackawanna,N.Y. B2	4.90
Mansfield,Mass. B5	5.20
Massillon,O. R2, R8	4.90
Midland,Pa. C18	4.90
Monaca,Pa. S17	4.90
Newark,N.J. W18	5.20
Plymouth,Mich. P5	5.10
So.Chicago,Ill. R2, W14	4.90
Struthers,O. Y1	4.90
Waukegan,Ill. A7	4.90
Warren,O. C17	4.90
Worcester,Mass. A7	5.20
Youngstown F3, Y1	4.90

RAIL STEEL BARS

ChicagoHts. (3) C2, I-2	3.30
ChicagoHts. (4) C2, I-2	3.45
Franklin,Pa. (3) F5	3.30
Franklin,Pa. (4) F5	3.45
FortWorth,Tex.(26) T4	4.33
Huntngtn,W.Va.(3) W7	3.45
Moline,Ill.(3) R2	3.40
SouthAvis,Pa.(2) J8	3.30
SouthAvis,Pa.(41) J8	3.30
SouthAvis,Pa.(42) J8	3.30
Williamsport(2,3) S19	3.45

BARS, Wrought Iron

Economy,Pa.(S.R.) B14	9.50
Economy,Pa.(D.R.)B14	11.00
Economy,(Staybolt)B14	11.30
Dover,N.J.(Staybolt)U1	15.00
Dover(Eng. Bolt) U1	13.50
Dover(Wrgt.Iron) U1	12.25
McK.Rks.(S.R.) L5	8.60
McK.Rks.(D.R.) L5	11.25
McK.Rks.(Staybolt) L5	12.75

BARS, Reinforcing

(Fabricated; to Consumers)

Huntington,W.Va. W7	4.50
Johnstown, ¼-1" B2	4.35
Los Angeles B3	5.00
Seattle B3, N14	5.10
SouthAvis,Pa. J8	4.35
So.SanFrancisco B3	5.00
SparrowsPt., ¼-1" B2	4.35
Williamsport,Pa. S19	4.35

BARS, Reinforcing (Fabricators)

AlabamaCity,Ala. R2	3.45
Alton,Ill.(6) L1	3.45
Atlanta,Ga. A11	3.60
Buffalo R2	3.45
Cleveland R2	3.45
Emeryville,Calif. J7	4.20
Fairfield,Ala. T2	3.45
Fontana,Calif. K1	4.10
Gary,Ind. C3	3.45
Houston,Tex. S5	3.85
Ind.Harbor,Ind. I-2,Y1	3.45
Johnstown,Pa. B2	3.45
KansasCity,Mo. S5	4.05
Lackawanna,N.Y. B2	3.45
LosAngeles B3	4.15
Milton,Pa. B6	3.45
Minnequa,Colo. C10	4.25
Niles,Calif. P1	4.17
Pittsburg,Calif. C11	4.15
Pittsburgh J5	3.45
Portland,Oreg. O4	4.20
SandSprings,Okla. S5	4.35
Seattle,Wash. B3, N14	4.20
SouthAvis,Pa. J8	3.45
So.Chicago,Ill. R2	3.45
So.Duquesne,Pa. C3	3.45
So.SanFrancisco B3	4.20
SparrowsPoint,Md. B2	3.45
Struthers,O. Y1	3.45
Torrance,Calif. C11	4.15
Youngstown C3. R2	3.45

BAR SHAPES, Hot-Rolled Alloy

Clairton,Pa. C3	4.20
Fontana,Calif. K1	4.95
Gary,Ind. C3	4.20
Youngstown C3	4.20

SHEETS, Hot-Rolled Steel (18 gage and heavier)

AlabamaCity,Ala. R2	3.35
Ashland,Ky.(8) A10	3.35
Butler,Pa. A10	3.35
Cleveland J5, R2	3.35
Conshohocken,Pa. A3	3.45
Ecorse,Mich.(8) G5	3.55
Fairfield,Ala. T2	3.35
Fontana,Calif. K1	4.25
Gary,Ind. C3	3.35
Ind.Harbor,Ind. I-2, Y1	3.35
Irvin,Pa. C3	3.35
Lackawanna,N.Y. B2	3.35
Munhall,Pa. C3	3.35
Niles,O. M4	3.75
Pittsburg,Calif. C11	4.05
Pittsburgh J5	3.35
Sharon,Pa. S3	3.35
So.Chicago,Ill. W14	3.35
SparrowsPoint,Md. B2	3.35
Steubenville,O. W10	3.35
Torrance,Calif. C11	4.05
Warren,O. R2	3.35
Weirton,W.Va. W6	3.35
Youngstown C3, Y1	3.35

SHEETS, Hot-Rolled Carbon Steel (19 gage and lighter)

AlabamaCity,Ala. R2	4.50
Dover,O. R1	4.65
Ind.Harbor,Ind. I-2	4.40
Mansfield,O. E6	4.15
Niles,O. N12	4.10
Niles,O. M4	4.65
Torrance,Calif. C11	5.15

SHEETS, H-R (14 ga., heavier) High-Strength Low-Alloy

Cleveland J5, R2	5.05
Conshohocken,Pa. A3	5.05
Ecorse,Mich. G5	5.25
Fairfield,Ala. T2	5.05
Fontana,Calif. K1	6.74
Gary,Ind. C3	5.05
Ind.Harbor,Ind. I-2, Y1	5.05
Irvin,Pa. C3	5.05
Lackawanna(35) B2	5.05
Pittsburgh J5	5.05
Sharon,Pa. S3	5.05
So.Chicago,Ill. C2	5.05
SparrowsPoint(36) B2	5.05
Warren,O. R2	5.05
Weirton,W.Va. W6	5.05
Youngstown, C3, Y1	5.05

SHEETS, Cold-Rolled High-Strength Low-Alloy

Cleveland J5, R2	6.20
Ecorse,Mich. G5	6.40
Fontana,Calif. K1	7.05
Gary,Ind. C3	6.20
Ind.Harbor,Ind. I-2, Y1	6.20
Irvin,Pa. C3	6.20
Lackawanna(37) B2	6.20
Pittsburgh J5	6.20
Sharon,Pa. S3	6.20
SparrowsPoint(38) B2	6.20
Warren,O. R2	6.20
Weirton,W.Va. W6	6.20
Youngstown Y1	6.20

SHEETS, Cold-Rolled Steel (Commercial Quality)

Butler,Pa. A10	4.10
Cleveland J5, R2	4.10
Ecorse,Mich. G5	4.30
Fairfield,Ala. T2	4.10
Follansbee,W.Va. F4	4.10
Fontana,Calif. K1	5.00
Gary,Ind. C3	4.10
GraniteCity,Ill. G4	4.30
Ind.Harbor,Ind. I-2, Y1	4.10
Irvin,Pa. C3	4.10
Lackawanna,N.Y. B2	4.10
Middletown,O. A10	4.10
Pittsburg,Calif. C11	5.05
Pittsburgh J5	4.10
SparrowsPoint,Md. B2	4.10
Steubenville,O. W10	4.10
Warren,O. R2	4.10
Weirton,W.Va. W6	4.10
Youngstown Y1	4.10

SHEETS, Gal'vd No. 10 Steel

AlabamaCity,Ala. R2	4.40
Ashland,Ky.(8) A10	4.40
Canton,O. R2	4.40
Delphos,O. N16	5.15
Dover,O. R1	4.75
Fairfield,Ala. T2	4.40
Gary,Ind. C3	4.40
GraniteCity,Ill. G4	4.60
Ind.Harbor,Ind. I-2	4.40
Irvin,Pa. C3	4.40
Kokomo,Ind. C16	4.50
MartinsFerry,O. W10	4.40
Niles,O. N12	4.65
Pittsburg,Calif. C11	5.15
SparrowsPoint,Md. B2	4.40
Steubenville,O. W10	4.40
Torrance,Calif. C11	5.15
Weirton,W.Va. W6	4.40

SHEETS, Galvanized No. 10, High-Strength Low Alloy

Irvin,Pa. C3	6.75
SparrowsPoint(39) B2	6.75

SHEETS, Galvannealed Steel

Canton,O. R2	4.95
Irvin,Pa. C3	4.95
Kokomo,Ind. C16	5.05
Niles,O. N12	5.20

SHEETS, ZINCGRIP Steel No. 10

Butler,Pa. A10	4.65
Middletown,O. A10	4.65

SHEETS, Electro Galvanized

Cleveland R2 (28)	5.25
Niles,O. R2 (28)	5.25
Weirton,W.Va. W6	5.10

SHEETS, Zinc Alloy

Ind.Harbor,Ind. I-2	5.05

SHEETS, Long Terne, Steel (Commercial Quality)

BeechBottom,W.Va. W10	4.80
Gary,Ind. C3	4.80
Mansfield,O. E6	4.80
Middletown,O. A10	4.80
Niles,O. N12	4.80
Weirton,W.Va. W6	4.80

SHEETS, Long Terne, Ingot Iron

Middletown,O. A10	5.20

ROOFING SHORT TERNES (Package; 8 lb coated)

Gary,Ind. C3	$17.50
Yorkville,O. W10	17.50

MANUFACTURING TERNES (Special Coated)

Fairfield,Ala. T2	$6.45
Gary,Ind. C3	6.35
Irvin,Pa. C3	6.35
Yorkville,O. W10	6.35

SHEETS, Lt. Coated Ternes, 6 lb

Yorkville,O. W10	$7.05

SHEETS, Mfg. Ternes, 8 lb

Gary,Ind. C3	$8.10
Warren,O. R2	8.10
Yorkville,O. W10	8.10

SHEETS, Culvert No. 16	Cu Alloy	Cu Fe
Ashland A10	5.20	...
Canton,O. R2	5.25	5.70
Fairfield,Ala. T2	5.20	5.45
Gary C3	5.20	5.45
IndianaHarbor I-2	5.20	5.45
Irvin,Pa. C3	5.20	5.45
Kokomo C16	5.40	...
MartinsFy,O. W10	5.20	5.45
Pittsburg,Cal. C11	5.95	...
SparrowsPt. B2	5.20	...
Torrance,Cal. C11	5.95	...

SHEETS, Culvert, No. 16 Corrugated Ingot Iron

Ashland,Ky. A10	5.45

SHEETS, Hot-Rolled Ingot Iron 18 Gage and Heavier

Ashland,Ky.(8) A10	3.60
Cleveland R2	3.95
Ind.Harbor,Ind. I-2	3.60
Warren,O. R2	3.95

SHEETS, Cold-Rolled Ingot Iron

Cleveland R2	4.70
Middletown,O. A10	4.60
Warren,O. R2	4.70

SHEETS, Galvanized Ingot Iron No. 10 Flat

Ashland,Ky(8) A10	4.65
Canton,O. R2	5.15
Ind.Harbor,Ind. I-2	4.80

SHEETS, ZINCGRIP Ingot Iron

Butler,Pa. A10	4.90
Middletown,O. A10	4.90

SHEETS, Well Casing

Torrance,Calif. C11	4.85

SHEETS, Drum Body

Pittsburg,Calif. C11	4.05
Torrance,Calif. C11	4.05

SHEETS, Aluminized

Butler,Pa. A10	7.75

TIN PLATE, Electrolytic (Base Box)	0.25 lb	0.50 lb	0.75 lb
Aliquippa,Pa. J5	$6.35	$6.60	$6.85
Fairfield,Ala. T2	6.45	6.70	6.95
Gary,Ind. C3	6.35	6.60	6.85
GraniteCity,Ill. G4	6.55	6.80	7.05
Ind.Harbor,Ind. I-2, Y1	6.35	6.60	6.85
Irvin,Pa. C3	6.35	6.60	6.85
Niles,O. R2	6.35	6.60	6.85
Pittsburg,Calif. C11	7.10	7.35	7.60
SparrowsPoint,Md. B2	6.45	6.70	6.95
Weirton,W.Va. W6	6.35	6.60	6.85
Yorkville,O. W10	6.35	6.60	6.85

SHEETS, SILICON, H.R. or C.R.(22 Ga.) COILS (Cut Lengths ½c lower)	Field	Armature	Electric	Motor	Dynamo
BeechBottom W10 (cut lengths)	...	...	6.70	7.95	8.75
Brackenridge,Pa. A4	...	...	7.20	8.45	9.25
GraniteCity,Ill. G4(cut lengths)	...	...	6.90	8.15	...
Ind.Harbor,Ind. I-2	6.40	6.70	(34)	...	...
Mansfield,O. E6 (cut lengths)	5.90	6.20	6.70	7.95	8.75
Niles,O. N12 (cut lengths)	...	6.20	6.70	...	...
Niles,O. M4 (24 Gage)	5.65	5.95	6.45	...	...
Parkersburg F4 (cut lengths)	...	...	6.70	7.95	8.75
Vandergrift,Pa. C3	...	6.70	7.20	8.45	9.25
Warren,O. R2	6.40	6.70	7.20	8.45	9.25
Zanesville,O. A10	...	6.70	7.20	8.45	9.25

SHEETS, SILICON (22 Gage Base) Coils (Cut Lengths ½c lower)

Transformer Grade	72	65	58	52
BeechBottom W10 (cut lengths)	9.30	9.85	10.55	11.35
Brackenridge,Pa. A4	9.80	10.35	11.05	....
Parkersburg F4 (cut lengths)	9.30	....	....	....
Vandergrift,Pa. C3	9.80	10.35	11.05	11.85
Warren,O. R2	9.80	....	....	....
Zanesville,O. A10	9.80	10.35	11.05	11.85

H.R. or C.R. COILS AND CUT LENGTHS, SILICON (22 Ga.)	T-100	T-90	T-80	T-73
Vandergrift,Pa. C3	12.35	13.20	14.20	14.70

TIN PLATE, American COKE (Base Box)	1.25 lb	1.50 lb
Aliquippa J5	$7.30	$7.50
Fairfield,Ala. T2	7.40	7.60
Gary C3	7.30	7.50
Gran.City,Ill. G4	7.50	7.70
Ind.Harbor I-1, Y1	7.30	7.50
Irvin,Pa. C3	7.30	7.50
Pitts.Cal. C11	8.05	8.25
Sp.Pt.,Md. B2	7.40	7.60
Warren R2	7.30	7.50
Weirton W6	7.30	7.50
Yorkville,O. W10	7.30	7.50

CANMAKING BLACK PLATE (Base Box)

Aliquippa,Pa. J5	$5.60
Fairfield,Ala. T2	5.70
Gary,Ind. C3	5.60
GraniteCity,Ill. G4	5.80
Ind.Harbor,Ind. I-2, Y1	5.60
Irvin,Pa. C3	5.60
Niles,O. R2	5.60
Pittsburg,Calif. C11	6.35
SparrowsPoint,Md. B2	5.70
Warren,O. R2	5.60
Weirton,W.Va. W6	5.60
Yorkville,O. W10	5.60

HOLLOWARE ENAMELING Black Plate (29 gage)

Aliquippa,Pa. J5	5.30
Follansbee,W.Va. F4	5.30
Gary,Ind. C3	5.30
GraniteCity,Ill. G4	5.50
Ind.Harbor,Ind. Y1	5.30
Irvin,Pa. C3	5.30
Niles,O. R2	5.30
SparrowsPoint,Md. B2	5.40
Warren,O. R2	5.30
Yorkville,O. W10	5.30

SHEETS, Enam'lg. Iron

Ashland,Ky.(8) A10	4.40
Cleveland R2	4.40
Ecorse,Mich. G5	4.70
Gary,Ind. C3	4.40
GraniteCity,Ill. G4	4.60
Ind.Harbor,Ind. I-2	4.40
Irvin,Pa. C3	4.40
Middletown,O. A10	4.40
Niles,O. M4	4.90
Youngstown Y1	4.40

STRIP, Hot-Rolled, High-Strength Low-Alloy

Bessemer,Ala. T2	4.95
Conshohocken,Pa. A3	4.95
Ecorse,Mich. G5	5.15
Fairfield,Ala. T2	4.95
Fontana,Cal. K1	6.64
Gary,Ind. C3	4.95
Ind.Harb.,Ind. I-2, Y1	4.95
Lackawanna,N.Y. B2	4.95
Sharon,Pa. S3	4.95
SparrowsPoint,Md. B2	4.95
Warren,O. R2	4.95
Weirton,W.Va. W6	4.95
Youngstown C3, Y1	4.95

STRIP, Hot-Rolled Alloy

Bridgeprt,Conn.(10) S15	5.10
Carnegie,Pa. S18	5.10
Fontana,Calif. K1	6.30
Gary,Ind. C3	5.10
Houston,Tex. S5	5.50
KansasCity,Mo. S5	5.70
NewBritn,Conn.(10) S15	5.10
Sharon,Pa. S3	5.10
Youngstown C3	5.10

STRIP, Hot-Rolled Ingot Iron

Ashland,Ky.(8) A10	3.50
Warren,O. R2	3.85

STRIP, Hot-Rolled Carbon

Alton,Ill.(1) L1	3.25
Ashland,Ky.(8) A10	3.25
Atlanta A11	3.40
Bessemer,Ala. T2	3.25
Bridgeprt,Conn.(10) S15	3.25
Butler,Pa. A10	3.25
Carnegie,Pa. S18	3.25
Conshohocken,Pa. A3	3.35
Detroit M1	3.45
Ecorse,Mich. G5	3.45
Fairfield,Ala. T2	3.25
Fontana,Calif. K1	4.40
Gary,Ind. C3	3.25
Houston,Tex. S5	3.65
Ind.Harbor,Ind. I-2, Y1	3.25
KansasCity,Mo.(9) S5	3.85
Lackawanna,N.Y. B2	3.25
LosAngeles B3	4.00
Milton,Pa. B6	3.25
Minnequa,Colo. C10	4.30
NewBritain(10) S15	3.25
N.Tonawanda,N.Y. B11	3.25
Pittsburg,Calif. C11	4.00
Riverdale,Ill. A1	3.25
SanFrancisco S7	4.00
Seattle B3, N14	4.25
Sharon,Pa. S3	3.25
So.Chicago,Ill. W14	3.25
So.SanFrancisco B3	4.00
SparrowsPoint,Md. B2	3.25
Torrance,Calif. C11	4.00
Warren,O. R2	3.25
Weirton,W.Va. W6	3.25
WestLeechburg,Pa. A4	3.25
Youngstown C3, Y1	3.25

STRIP, Cold-Rolled Alloy Steel

Bridgprt,Conn.(10) S15	9.50
Carnegie,Pa. S18	9.50
Cleveland A7	9.50
Dover,O. G6	9.50
Harrison,N.J. C18	9.50
NewBritn,Conn.(10) S15	9.50
Pawtucket,R.I.(11) N8	9.50
Pawtucket,R.I.(12) N8	9.80
Sharon,Pa. S3	9.50
Worcester,Mass. A7	9.80
Youngstown C8	9.50

STRIP, Cold-Rolled Ingot Iron

Warren,O. R2	4.75

STRIP, Cold-Rolled Carbon

Anderson,Ind.(40) G[illegible]	4.15
Berea,O. C7	6.60
Bridgprt,Conn.(10) S15	4.15
Butler,Pa. A10	4.15
Cleveland A7, J5	4.15
Dearborn,Mich. D3	4.40
Detroit, D2	4.40
Detroit M1	4.35
Dover,O.(40) G6	4.15
Ecorse,Mich. G5	4.35
Follansbee,W.Va. F4	4.15
Fontana,Calif. K1	5.40
FranklinPark,Ill. T6	4.30
Ind.Harbor,Ind. I-2	4.30
Lackawanna,N.Y. B2	4.15
LosAngeles C1	5.50
Mattapan,Mass.(21) T6	4.65
Middletown,O. A10	4.15
NewBritain(10) S15	4.15
NewCastle,Pa. B4	4.15
NewCastle,Pa.(40) E5	4.15
NewHaven,Conn. A7, D2	4.65
New York W3	5.00
Pawtucket,R.I.(21) N8	4.65
Riverdale,Ill. A1	4.30
Rome,N.Y. R6	4.15
Sharon,Pa. S3	4.15
SparrowsPoint,Md. B2	4.15
Trenton,N.J.(13) R5	4.65
Wallingford,Conn. W2	4.65
Warren,O.(40) T5	4.15
Warren,O. R2	4.15
Weirton,W.Va. W6	4.15
Youngstown C8, Y1	4.15

STRIP, Cold-Rolled, High-Strength Low-Alloy

Cleveland A7, J5	6.20
Dover,O. G6	6.20
Ecorse,Mich. G5	6.40
Fontana,Calif. K1	6.95
Lackawanna,N.Y., B2	6.40
Sharon,Pa. S3	6.20
SparrowsPoint,Md. B2	6.40
Warren,O. R2	6.20
Weirton, W. Va. W6	6.20
Youngstown Y1	6.20

STRIP, Electro Galvanized

Weirton,W.Va. W6	4.15
Youngstown C8	4.15

STRIP, Cold-Finished, Spring Steel (Annealed)	0.26-0.40C	0.41-0.60C	0.61-0.80C	0.81-1.05C	1.06-1.35C
Bridgeport,Conn.(10) S15	4.15	5.95	6.55	8.50	10.80
Bristol,Conn. W1	...	...	6.85	8.80	....
Carnegie,Pa. S18	...	5.95	6.55	8.50	10.80
Cleveland A7	4.15	5.95	6.55	8.50	10.80
Dover,O. G6	4.15	5.95	6.55	8.50	10.80
FranklinPark,Ill. T6	4.40	6.10	6.70	8.65	....
Harrison,N.J. C18	...	...	6.85	8.80	11.10
Mattapan,Mass. T6	4.65	6.25	6.85	8.80	11.10
NewBritn.,Conn.(10) S15	4.15	5.95	6.55	8.50	10.80
NewCastle,Pa. B4	4.15	5.95	6.55	8.50	....
NewCastle,Pa. E5	4.15	5.95	6.55	8.50	10.80
NewYork W3	...	6.30	6.90	8.85	11.15
Pawtucket,R.I. N8:					
Cleve.orPitts.Base	4.70	5.95	6.55	8.50	10.80
Worcester,Base	4.65	6.25	6.85	8.80	11.10
Sharon,Pa. S3	4.15	5.95	6.55	8.50	10.80
Trenton,N.J. R5	...	6.25	6.85	8.80	11.10
Wallingford,Conn. W2	4.65	6.25	6.85	8.80	11.10
Weirton,W.Va. W6	4.15	5.95	6.55	8.50	10.80
Worcester,Mass. A7	4.45	6.25	6.85	8.80	11.10
Worcester,Mass. T6	4.65	6.25	6.85	8.80	11.10
Youngstown C8	4.50	5.95	6.55	8.50	10.80
Spring Steel (Tempered)					
Trenton,N.J. R5	...	...	9.30	11.25	13.85
Harrison,N.J. C18	...	...	9.30	11.25	13.85

Key to Producing Companies

A1	Acme Steel Co.
A3	Alan Wood Steel Co.
A4	Allegheny Ludlum Steel
A7	American Steel & Wire
A8	Anchor Drawn Steel Co.
A9	Angell Nail & Chaplet
A10	Armco Steel Corp.
A11	Atlantic Steel Co.
A13	American Cladmetals Co.
B1	Babcock & Wilcox Tube
B2	Bethlehem Steel Co.
B3	Beth. Pac. Coast Steel
B4	Blair Strip Steel Co.
B5	Bliss & Laughlin Inc.
B6	Boiardi Steel Corp.
B8	Braeburn Alloy Steel
B11	Buffalo Bolt Co.
B14	A. M. Byers Co.
C1	Calif. Cold Rolled Steel
C2	Calumet Steel Div., Borg-Warner Corp.
C3	Carnegie-Illinois Steel
C4	Carpenter Steel Co.
C5	Central Iron & Steel Div. Barium Steel Corp.
C7	Cleve.Cold.Roll.Mills Co.
C8	Cold Metal Products Co.
C9	Colonial Steel Co.
C10	Colorado Fuel & Iron
C11	Columbia Steel Co.
C12	Columbia Steel & Shaft.
C13	Columbia Tool Steel Co.
C14	Compressed Steel Shaft
C16	Continental Steel Corp.
C17	Copperweld Steel Co.
C18	Crucible Steel Co.
.C19	Cumberland Steel Co.
C20	Cuyahoga Steel & Wire
D2	Detroit Steel Corp.
D3	Detroit Tube & Steel
D4	Disston & Son, Henry
D6	Driver-Harris Co.
D7	Dickson Weatherproof Nail Co.
E1	Eastern Gas&Fuel Assoc.
E2	Eastern Stainless Steel
E4	Electro Metallurgical Co.
E5	Elliott Bros. Steel Co.
E6	Empire Steel Corp.
F2	Firth Sterling Steel
F3	Fitzsimons Steel Co.
F4	Follansbee Steel Corp.
F5	Franklin Steel Div., Borg-Warner Corp.
F6	Fretz-Moon Tube Co.
G1	Geneva Steel Co.
G2	Globe Iron Co.
G3	Globe Steel Tubes Co.
G4	Granite City Steel Co.
G5	Great Lakes Steel Corp.
G6	Greer Steel Co.
H1	Hanna Furnace Corp.
H4	Heppenstall Co.
I-1	Igoe Bros. Inc.
I-2	Inland Steel Co.
I-3	Interlake Iron Corp.
I-4	Ingersoll Steel Div., Borg-Warner Corp.
J1	Jackson Iron & Steel Co.
J3	Jessop Steel Co.
J4	Johnson Steel & Wire Co.
J5	Jones & Laughlin Steel
J6	Joslyn Mfg. & Supply
J7	Judson Steel Corp.
J8	Jersey Shore Steel Co.
K1	Kaiser Steel Corp.
K2	Keokuk Electro-Metals
K3	Keystone Drawn Steel
K4	Keystone Steel & Wire Co.
K5	Kidd Drawn Steel Co.
L1	Laclede Steel Co.
L2	LaSalle Steel Co.
L3	Latrobe Electric Steel
L5	Lockhart Iron & Steel
L6	Lone Star Steel Co.
L7	Lukens Steel Co.

TIGHT COOPERAGE HOOP

Atlanta A11	3.60
Riverdale,Ill. A1	*3.40*
Sharon,Pa. S3	3.40
Youngstown C3	*3.40*

WIRE, MB Spring, HighCarbon

Aliquippa,Pa. J5	5.90
Alton,Ill.(1) L1	5.90
Bartonville,Ill.(1) K4	5.90
Buffalo W12	5.90
Cleveland A7	5.90
Donora,Pa. A7	5.90
Duluth A7	5.90
Fostoria,O. S1	5.90
Johnstown,Pa. B2	5.90
LosAngeles B3	6.85
Milbury,Mass(12) N6	6.20
Monessen,Pa. P7, P16	5.90
Palmer,Mass. W12	6.20
Pittsburg,Calif. C11	6.85
Portsmouth,O. P12	5.90
Roebling,N.J. R5	6.20
So.Chicago,Ill. R2	5.90
SparrowsPoint,Md. B2	6.00
Struthers,O. Y1	5.90
Trenton,N.J. A7	6.20
Waukegan,Ill. A7	5.90
Worcester A7,J4,T6,W12	6.20

WIRE, Cold-Rolled Flat

Anderson,Ind. G6	5.35
Buffalo W12	5.35
Cleveland A7	5.35
Crawfordsville,Ind. M8	5.35
Dover,O. G6	5.35
Fostoria,O. S1	5.50
Kokomo,Ind. C16	5.35
FranklinPark,Ill. T6	5.70
Massillon,O. R8	5.35
Monessen,Pa. P7, P16	5.35
Pawtucket,R.I.(12) N8	5.65
Trenton,N.J. R5	5.65
Worcester A7, T6, W12	5.65

WIRE, Fine and Weaving (8-in. Coils)

Bartonville,Ill.(1) K4	8.45
Buffalo W12	8.45
Chicago W13	8.45
Cleveland A7	8.45
Crawfordsville,Ind. M8	8.45
Fostoria,O. S1	8,45
Johnstown,Pa. B2	8.45
Kokomo,Ind. C16	8.45
Monessen,Pa. P16	8.45
Palmer,Mass. W12	8.75
Portsmouth,O. P12	8.45
Roebling,N.J. R5	8.75
Waukegan,Ill. A7	8.45
Worcester,Mass. A7, T6	8.75

WIRE, Tire Bead

Monessen,Pa. P16	10.80
Roebling,N.J. R5	10.80

WIRE, Manufacturers Bright, Low-Carbon

AlabamaCity,Ala. R2	4.50
Aliquippa,Pa. J5	4.50
Atlanta A11	4.60
Alton,Ill.(1) L1	4.50
Bartonville,Ill.(1) K4	4.50
Buffalo W12	4.50
Chicago W13	4.50
Cleveland A7, C20	4.50
Crawfordsville,Ind. M8	4.60
Donora,Pa. A7	4.50
Duluth A7	4.50
Fairfield,Ala. T2	4.50
Fostoria,O.(24) S1	4.85
Houston S5	4.90
Johnstown,Pa. B2	4.50
Joliet,Ill. A7	4.50
KansasCity,Mo. S5	5.10
Kokomo,Ind. C16	4.60
Los Angeles B3	5.45
Minnequa,Colo. C10	4.75
Monessen,Pa. P7	4.50
Newark, 6-8ga. I-1	5.15
No.Tonawanda B11	4.90
Palmer,Mass. W12	4.80
Pittsburg,Calif. C11	5.45
Portsmouth,O. P12	4.50
Rankin,Pa. A7	4.50
So.Chicago,Ill. R2	4.50
So.SanFrancisco C10	5.45
SparrowsPoint,Md. B2	4.60
Sterling,Ill(1) N15	4.50
Struthers,O. Y1	4.50
Torrance,Calif. C11	5.45
Waukegan,Ill. A7	4.50
Worcester,Mass. A7, T6	4.80

WIRE, Upholstery Spring

Aliquippa,Pa. J5	5.55
Alton,Ill.(1) L1	5.55
Buffalo W12	5.55
Cleveland A7	5.55
Donora,Pa. A7	5.55
Duluth A7	5.55
Johnstown,Pa. B2	5.55
LosAngeles B3	6.50
Monessen,Pa. P7, P16	5.55
NewHaven,Conn. A7	5.85
Palmer,Mass. W12	5.85
Pittsburg,Calif. C11	6.50
Portsmouth,O. P12	5.55
Roebling,N.J. R5	5.85
So.Chicago,Ill. R2	5.55
SparrowsPoint,Md. B2	5.65
Struthers,O. Y1	5.55
Torrance,Calif. C11	6.50
Trenton,N.J. A7	5.85
Waukegan,Ill. A7	5.55
Worcester,Mass. A7	5.85

WIRE, Galv'd ACSR for Cores

Monessen,Pa. P16	8.15
Roebling,N.J. R5	8.45
SparrowsPoint,Md. B2	8.25

ROPE WIRE

	Mild Plow	Plow	Imp. Plow
Bartonville,Ill. K4	8.05	8.05	8.30
Buffalo W12	8.05	8.05	8.30
Cleveland A7	8.05	8.05	8.30
Donora,Pa. A7	8.05	8.05	8.30
Fostoria,O. S1	8.05	8.05	8.30
Johnstown,Pa. B2	8.05	8.05	8.30
Monessen,Pa. P7, P16	8.05	8.05	8.30
NewHaven,Conn. A7	8.35	8.35	8.60
Palmer,Mass. W12	8.35	8.35	8.60
Portsmouth,O. P12	8.05	8.05	8.30
Roebling,N.J. R5	8.35	8.35	8.60
SparrowsPoint,Md. B2	8.15	8.15	8.40
Struthers,O. Y1	8.05	8.05	8.30
Trenton,N.J. A7	8.35	8.35	8.60
Waukegan,Ill. A7	8.05	8.05	8.30
Williamsport,Pa. B2	8.15	8.15	8.40
Worcester,Mass. J4, T6	8.35	8.35	8.60

WIRE Merchant Quality (6 to 8 gage)

	An'ld	Galv.
AlabamaCity R2	5.35	5.60
Aliquippa J5	5.35	5.60
Atlanta A11	5.45	5.70
Bartonville(19) K4	5.35	5.60
Buffalo(31) W12	4.50	...
Cleveland A7	5.35	5.60
Crawfordsvil. M8	5.45	5.70
Donora A7	5.35	5.60
Duluth A7	5.35	5.60
Fairfield T2	5.35	5.60
Houston,Tex. S5	5.75	6.00
Johnstown B2	5.35	5.60
Joliet,Ill. A7	5.35	5.60
KansasCy,Mo. S5	5.95	6.20
Kokomo C16	5.45	5.70
Los Angeles B3	6.30	...
Minnequa C10	5.60	5.85
Monessen P7	5.35	5.60
Palmer(31) W12	4.80	...
Pitts.,Cal. C11	6.30	6.55
Prtsmth.(18) P12	5.35	5.60
Rankin A7	5.35	5.60
So. Chicago R2	5.35	5.60
So.S.Fran. C10	6.30	6.55
SparrowsPt. B2	5.45	5.70
Sterling,Ill.(1)N15	5.35	5.60
Struthers,O. Y1	5.35	5.60
Torrance,Cal. C11	6.30	...
Worcester A7	5.65	5.90

WIRE (16 gage)

	An'ld Stone	Galv. Stone
Aliquippa J5	9.80	11.30
Bartonville(1) K4	9.80	11.30
Cleveland A7	9.80	11.30
Crawfrdvil. M8	9.80	11.30
Fostoria,O. S1	9.90	11.40
Johnstown B2	9.80	11.30
Kokomo C16	9.80	11.30
Minnequa C10	*10.05*	*11.80*
Palmer,Mass. W12	9.80	11.30
Pitts.,Cal. C11	10.15	11.65
Prtsmth.(18) P12	9.80	11.30
SparrowsPt. B2	9.90	11.40
Waukegan A7	9.80	11.30

WIRE, Barbed

	Col.
AlabamaCity, Ala. R2	126
Aliquippa,Pa. J5	126
Atlanta A11	128
Crawfordsville M8	128
Donora,Pa A7	126
Duluth,Minn. A7	126
Fairfield,Ala. T2	126
Houston,Tex. S5	134
Johnstown,Pa. B2	126
Joliet,Ill. A7	126
KansasCity,Mo. S5	138
Kokomo,Ind. C16	128
Minnequa,Colo. C10	131
Monessen,Pa. P7	126
Pittsburg,Calif. C11	146
Portsmouth,O.(18) P12	126
Rankin,Pa. A7	126
So.Chicago,Ill. R2	126
So.SanFran.,Calif. C10	146
SparrowsPoint,Md. B2	128
Sterling,Ill.(1) N15	126

FENCE POSTS

	Col.
ChicagoHts.,Ill. C2	116
Duluth A7	116
Franklin,Pa. F5	116
Huntington,W.Va. W7	116
Johnstown,Pa. B2	116
Joliet,Ill. A7	116
Minnequa,Colo. C10	121
Moline,Ill. R2	112
So.Chicago R2	116
Williamsport,Pa. S19	120

WOVEN FENCE, 9-15½ Ga.

	Col.
AlabamaCity, Ala. R2	116
Ala.City,Ala.,17-18ga.R2	198
Aliquippa,Pa.9-14½ga.J5	116
Atlanta A11	118
Bartonville,Ill.(19) K4	116
Crawfordsville,Ind. M8	118
Donora,Pa. A7	116
Duluth A7	116
Houston,Tex. S5	124
Fairfield,Ala. T2	116
Johnstown,Pa. B2	116
Johnstn,17ga.6" B2	190
Johnstn,17ga.,4" B2	193
Joliet,Ill. A7	116
KansasCity,Mo. S5	128
Kokomo,Ind. C16	118
Minnequa,Colo. C10	121
Monessen,Pa. P7	116
Pittsburg,Calif. C11	139
Portsmouth,O.(18) P12	116
Rankin,Pa. A7	116
So.Chicago,Ill. R2	116

BALE TIES, Single Loop

	Col.
AlabamaCity,Ala. R2	113
Atlanta A11	114
Bartonville,Ill.(19) K4	113
Chicago W13	113
Crawfordsville M8	115
Donora,Pa. A7	113
Duluth A7	113
Fairfield,Ala. T2	113
Joliet,Ill. A7	113
KansasCity, Mo. S5	125
Kokomo,Ind. C16	115
Minnequa,Colo. C10	118
Pittsburg,Calif. C11	137
Portsmouth,O.(18) P12	113
So.Chicago,Ill. R2	113
So.SanFran.,Calif. C10	137
SparrowsPoint,Md. B2	115
Sterling,Ill.(1) N15	113

NAILS & STAPLES, Stock

To Dealers & Mfrs. (7)	Col.
AlabamaCity,Ala. R2	106
Aliquippa,Pa. J5	106
Atlanta A11	108
Bartonville,Ill.(19) K4	106
Chicago,Ill. W13	106
Cleveland A9	112
Crawfordsville,Ind. M8	108
Donora,Pa. A7	106
Duluth A7	106
Fairfield,Ala. T2	106
Galveston,Tex. D7	114
Houston,Tex. S5	114
Johnstown,Pa. B2	106
Joliet,Ill. A7	106
KansasCity,Mo. S5	118
Kokomo,Ind. C16	108
Minnequa,Colo. C10	111
Monessen,Pa. P7	106
Pittsburg,Calif. C11	125
Portsmouth,O. P12	106
Rankin,Pa. A7	106
So.Chicago,Ill. R2	106
SparrowsPoint,Md. B2	108
Sterling,Ill.(1) N15	106
Torrance,Calif. C11	126
Worcester,Mass. A7	112

NAILS & STAPLES, Non-Stock

AlabamaCity,Ala. R2	5.35
Bartonville,Ill.(19) K4	5.35
Crawfordsville,Ind. M8	5.45
Donora,Pa. A7	5.35
Duluth A7	5.35
Johnstown,Pa. B2	5.35
Joliet,Ill. A7	5.35
Kokomo,Ind. C16	5.45
Minnequa,Colo. C10	5.60
Pittsburg,Calif. C11	6.30
Portsmouth,O. P12	5.35
Rankin,Pa. A7	5.35
So.Chicago,Ill. R2	5.35
SparrowsPoint,Md. B2	5.45
Worcester,Mass. A7	5.65

NAILS, Cut (100 lb keg) To dealers (33)

Conshohocken,Pa. A3	$6.75
Wheeling,W.Va. W10	6.75

AXLES

Fairfield,Ala. T2	5.25
Gary,Ind. C3	5.25
Ind.Harbor,Ind. S13	5.25
Johnstown,Pa. B2	5.25
McKeesRocks,Pa. C3	5.25

TIE PLATES

Fairfield,Ala. T2	4.20
Gary,Ind. C3	4.20
Ind.Harbor,Ind. I-2	4.20
Lackawanna,N. Y. B2	4.20
Minnequa,Colo. C10	4,20
Pittsburgh,Calif. C11	4.35
Pittsburgh R2	4.20
Seattle B3	4.35
Steelton,Pa. B2	4.20
Torrance,Calif. C11	4.35
Weirton,W. Va. W6	4.20

JOINT BARS

Bessemer,Pa. C3	4.40
Fairfield,Ala. T2	4.40
Ind.Harbor,Ind. I-2	4.40
Joliet,Ill. C3	4.40
Lackawanna,N.Y. B2	4.40
Minnequa,Colo. C10	4.40
Sheelton,Pa. B2	4.40

TRACK BOLTS (20)

	Treated
Fairfield,Ala. T2	9.10
KansasCity,Mo. S5	9.10
Lebanon,Pa.(32) B2	8.85
Minnequa,Colo. C10	8.85
Pittsburgh O3, P14	9.10
Seattle B3	9.35

STANDARD TRACK SPIKES

Fairfield,Ala. T2	5.60
Ind.Harbor,Ind. I-2, Y1	5.60
KansasCity,Mo. S5	5.85
Lebanon,Pa. B2	5.60
Minnequa,Colo. C10	5.60
Pittsburgh J5	5.60
Seattle B3	6.10
So.Chicago,Ill. R2	5.60
Struthers,O. Y1	5.60
Youngstown R2	5.60

RAILS

	Std. No. 1	Std. No. 2	Std. All No. 2	TeeRails 60 lb Under
Bessemer,Pa. C3	3.40	3.30	3.35	3.75
Ensely,Ala. T2	3.40	3.30	...	3.75
Fairfield,Ala T2	...	...	...	3.75
Gary,Ind. C3	3.40	3.30	3.35	...
Huntington,W.Va. W7	...	...	...	3.75
Ind.Harbor.Ind. I-2	3.40	3.30	3.35	...
Johnstown,Pa. B2	...	...	...	(16)3.75
Lackawanna B2	3.40	3.30	...	3.75
Minnequa,Colo. C10	3.40	3.30	...	4.25
Steelton,Pa. B2	3.40	3.30	...	...
Williamsport,Pa. S19	...	...	...	3.75

Key to Producing Companies

M1	McLouth Steel Corp.
M4	Mahoning Valley Steel
M5	Medart Co.
M6	Mercer Tube & Mfg. Co.
M8	Mid-States Steel & Wire
M9	Midvale Co.
M10	Missouri-Illinois Furnace
M12	Moltrup Steel Products
M13	Monarch Steel Co.
M14	McInnes Steel Co.
N2	National Supply Co.
N3	National Tube Co.
N5	Nelsen Steel & Wire Co.
N6	New Eng.HighCarb.Wire
N8	Newman-Crosby Steel
N12	Niles Rolling Mill Co.
N14	Nrthwst. Steel Roll. Mills
N15	Northwestern S.&W. Co.
N16	New Delphos Mfg. Co.
O3	Oliver Iron&Steel Corp.
O4	Oregon Steel Mills
P1	Pacific States Steel Corp.
P2	Pacific Tube Co.
P4	Phoenix Iron & Steel Co.
P5	Pilgrim Drawn Steel
P6	Pittsburgh Coke&Chem.
P7	Pittsburgh Steel Co.
P9	Pittsburgh Tube Co.
P11	Pollak Steel Co.
P12	Portsmouth Steel Div. Detroit Steel Corp.
P13	Precision Drawn Steel
P14	Pitts. Screw & Bolt Co.
P15	Pittsburgh Metallurgical
P16	Page Steel & Wire Div., Amer. Chain & Cable
P17	Plymouth Steel Co.
R1	Reeves Steel & Mfg. Co.
R2	Republic Steel Corp.
R3	Rhode Island Steel Corp.
R5	Roebling's Sons, John A.
R6	Rome Strip Steel Co.
R7	Rotary Electric Steel Co.
R8	Reliance Div., EatonMfg.
S1	Seneca Wire & Mfg. Co.
S3	Sharon Steel Corp.
S5	Sheffield Steel Corp.
S6	Shenango Furnace Co.
S7	Simmons Co.
S8	Simonds Saw & Steel Co.
S9	Sloss-Sheffield S.&I. Co.
S13	Standard Forgings Corp.
S14	Standard Tube Co.
S15	Stanley Works
S16	Struthers Iron & Steel
S17	Superior Drawn Steel Co.
S18	Superior Steel Corp.
S19	Sweet's Steel Co.
T2	Tenn. Coal, Iron & R.R.
T3	Tenn. Prod. & Chem.
T4	Texas Steel Co.
T5	Thomas Steel Co.
T6	Thompson Wire Co.
T7	Timken Roller Bearing
T9	Tonawanda Iron Div. Am. Rad. & Stan. San.
U1	Ulster Iron Works
U4	Universal Cyclops Steel
V2	Vanadium Alloys Steel
V3	Vulcan Crucible Steel Co.
W1	Wallace Barnes Co.
W2	Wallingford Steel Co.
W3	Washburn Wire Co.
W4	Washington Steel Corp.
W6	Weirton Steel Co.
W7	W. Va. Steel & Mfg. Co.
W8	Wsrn.Auto. Mach.Screw
W9	Wheatland Tube Co.
W10	Wheeling Steel Corp.
W12	Wickwire Spencer Steel Div., Colo. Fuel & Iron
W13	Wilson Steel & Wire Co.
W14	Wisconsin Steel Div., International Harvester
W15	Woodward Iron Co.
W16	Worth Steel Co.
W18	Wyckoff Steel Co.
Y1	Youngstown Sheet & Tube

TOOL STEEL

Grade	Cents per lb	Grade	Cents per lb
Reg. Carbon	21.00	18W,4Cr,3V	126.00
Extra Carbon	24.50	18W,4Cr,2V,9Co	185.50
Spec. Carbon	29.50	18W,4Cr,2V,6Co	169.50
Oil Hardening	32.00	18.25W,4.25Cr,1V,4.75Co	156.50
Cr Hot Wrk.	32.00	20.25W,4.25Cr,1.6V,12.25Co	293.50
Hi-Carbon-Cr	57.50	1.5W,4Cr, 1V,8.5Mo	71.50
18W,4Cr,1V	100.00	6.4W,4.5Cr,1.9V,5Mo.	76.50
18W,4Cr,2V	113.00	6W,4Cr,3V,6Mo	97.00

Tool steel producers include: A4, A8, B2, B8, C4, C9, C13, C18, D4, F2, H4, J3, L3, M9, M14, R2, S8, T7, U4, V2, V3.

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(1) Chicago Base. (2) Angles.
(3) Merchant. (4) Reinforcing.
(5) Philadelphia del.
(6) Chicago or Birm. Base.
(7) To jobbers, 3 cols. lower.
(8) 16 gage and heavier.
(9) 6 in. and narrower.
(10) Pittsburgh Base.
(11) Cleveland & Pittsburgh Base.
(12) Worcester, Mass. Base.
(13) 3" & wider; over ½" to under 3" 5.15c.
(14) Also wide flange beams.
(15) ½" and thinner.
(16) 40 lb and under.
(17) Flats only.
(18) To dealers.
(19) Chicago & Pittsburgh Base.
(20) Deduct 0.25c for untreated.
(21) New Haven, Conn. Base.
(22) Del. San Fran. Bay area.
(23) Angles 1"x1" to 1¼"x1¼" only.
(24) Deduct 0.35c for finer than 15 Ga.
(26) Reinforcing, mill shipments; to consumers, 4.83c; fabricated to fabricators, 4.58c.
(28) Bonderized.
(31) Not annealed.
(32) Untreated.
(33) To jobbers, deduct 20 cents.
(34) 6.70c for cut lengths.
(35) 72" and narrower.
(36) 54" and narrower.
(37) 15 Ga. & lighter; 60" & narrower.
(38) 14 Ga. & lighter; 48" & narrower.
(39) 48" and narrower.
(40) Lighter than 0.035"; 4.40c, 0.035" and heavier.
(41) Flats.
(42) Bands.

STANDARD PIPE, T. & C.

BUTTWELD Size Inches	List Per Ft	Pounds Per Ft	Carload Discounts from List, % Black A	Black B	Black C	Galvanized D	Galvanized E	Galvanized F
⅛	5.5c	0.24	36.5	34.5	35.5	8.5	9.0	7.5
¼	6.0	0.42	33.5	31.5	32.5	9.5	11.0	8.5
⅜	6.0	0.57	29.0	27.0	28.0	5.5	8.0	4.5
½	8.5	0.85	40.5	38.5	39.5	24.0	22.0	23.0
¾	11.5	1.13	43.5	41.5	42.5	28.0	26.0	27.0
1	17.0	1.68	46.0	44.0	45.0	31.0	29.0	30.0
1¼	23.0	2.28	46.5	44.5	45.5	31.5	29.5	30.5
1½	27.5	2.73	47.0	45.0	46.0	32.0	30.0	31.0
2	37.0	3.68	47.5	45.5	46.5	32.5	30.5	31.5
2½	58.5	5.82	48.0	46.0	47.0	33.0	31.0	32.0
3	76.5	7.62	48.0	46.0	47.0	33.0	31.0	32.0

Column A: Etna, Pa. N2; Monaca, Pa. P9; Sharon, Pa. M6; Butler, Pa. ⅛-⅜", F6; Benwood, W. Va., 1½ percentage points lower on ⅛", 2 points lower on ¼", 3 points lower on ⅜", W10. Wheatland, Pa., 2 pts lower on ⅛" through ⅜", W9. Following make ½" and larger: Lorain, O. N3; Youngstown, plus 42% on 3½" and 4", R2; Youngstown Y1; Aliquippa, Pa. J5. Fontana, Calif. K1 quotes 11 points lower on ½" and larger continuous weld and 31% on 3½" and 4".

Columns B & E: Sparrows Point, Md. B2.

Columns C & F: Indiana Harbor, Ind., ½" through 3", Y-1; Alton, Ill. (Lorain, O., base) L1 quotes 2 points lower on ⅛", ¼", ⅜".

Column D: Etna, Pa. N2; Monaca, Pa. P9; Sharon, Pa. M6; Butler, Pa., ⅛" through ⅜", F6; Benwood, W. Va., except 3½ points lower on ⅛", 2½ pts on ¼", 3 pts on ⅜", W10. Wheatland, Pa., except 2 pts lower on ⅛" through ⅜", W9. Following make ½" and larger: Lorain, N3; Youngstown, plus 26.5% on 3½" and 4", R2; Youngstown, Y1; Aliquippa, Pa. J5. Fontana, Calif. K1 quotes 11 points lower on ½" and larger continuous weld and 15.5% on 3½" and 4".

SEAMLESS AND ELECTRIC WELD Size Inches	List Per Ft	Pounds Per Ft	Carload Discounts from List, % Seamless Black A	Seamless Galv. B	Elec. Weld Black C	Elec. Weld Galv. D
2	37.0c	3.68	36.0	20.5	36.0	20.5
2½	58.5	5.82	39.0	23.5	39.0	23.5
3	76.5	7.62	39.0	23.5	39.0	23.5
3½	92.0	9.20	41.0	25.5	41.0	25.5
4	$1.09	10.89	41.0	25.5	41.0	25.5
5	1.48	14.81	41.0	25.5	41.0	25.5
6	1.92	19.18	41.0	25.5	41.0	25.5

Column A: Aliquippa J5; Ambridge N2; Lorain N3; Youngstown Y1.

Column B: Aliquippa J5; Lorain, O. N3; Youngstown Y1.

Columns C & D: Youngstown R2.

BOILER TUBES

Net base c.l. prices, dollars per 100 ft, mill; minimum wall thickness, cut lengths 10 to 24 ft. inclusive.

O.D. In.	B.W. Ga.	Seamless H.R.	Seamless C.D.	Elec. Weld H.R.	Elec. Weld C.D.
1	13	12.36	14.39	13.96	13.96
1¼	13	14.63	17.05	14.19	16.54
1½	13	16.17	19.02	15.68	18.45
1¾	13	18.39	21.64	17.84	20.99
2	13	20.61	24.24	19.99	23.51
2¼	13	22.96	27.03	22.27	26.22
2¼	12	25.29	29.76	24.53	28.87
2½	12	27.71	32.58	26.88	31.60
2¾	12	29.36	34.53	28.48	33.49
3	12	30.82	36.27	29.90	35.18
3¼	11	35.87	42.22	34.79	40.95
3½	11	38.52	45.35	37.36	43.99
4	10	47.82	56.25	46.39	54.56
4½	9	63.37	74.59	61.47	72.35
5	9	73.37	86.32	71.17	83.73
6	7	112.62	132.51	....	....

Boiler tube producers include Babcock & Wilcox Tube Co., National Tube Co., Globe Steel Tubes Co., Pittsburgh Steel Co., Republic Steel Corp., Standard Tube Co.

CLAD STEELS

(Cents per pound)

Cladding Stainless	Plates Carbon Base 10%	Plates Carbon Base 20%	Strip Cold-Rolled Carbon Base 10%	Strip Cold-Rolled Carbon Base Both Sides	Sheets Carbon Base 10%	Sheets Carbon Base 20%	Sheets Copper Base Both Sides
302	....	....	....	....	19.75	21.50–22.50	75.00
304	22.50	26.50	....	....	20.75	22.50–24.00	77.00
305	....	....	....	....	....	....	79.00
309	27.00	31.00	....	....	....	....	....
310	32.50	36.50	....	....	....	....	105.00
316	27.00	31.00	....	....	26.00	28.00–32.00	....
317	30.50	34.50	....	....	....	....	....
318	29.50	33.50	....	....	....	....	....
321	23.50	27.50	....	....	23.00	25.00	90.00
347	25.00	29.00	....	....	24.00	26.00–30.00	94.00
405	18.75	24.75	....	....	....	....	....
410	18.25	24.25	....	....	....	....	....
430	18.25	24.25	....	....	....	....	....
Nickel	27.50	34.50	31.50	41.00	....	....	88.00
Inconel	36.00	46.00	....	....	....	....	115.00
Monel	29.00	37.00	26.50	33.50	....	....	83.00
Copper*	....	....	20.00†	24.25‡	....	....	....

* Deoxidized. † 16.50c for hot-rolled. ‡ 21.00c for hot-rolled. Production points for carbon base products: Stainless plates, sheets, Conshohocken, Pa. A3 and New Castle, Ind. I-4; stainless-clad plates, Claymont, Del. W16 and Coatesville L7; nickel, inconel, monel-clad plates, Coatesville L7; nickel, monel, copper-clad strip, Carnegie, Pa. S18. Production point for copper-base sheets is Carnegie A13.

BOLTS, NUTS

CARRIAGE, MACHINE BOLTS

(F.o.b. midwestern plants; per cent off list for less than case lots to consumers)

6 in. and shorter:	
½-in. & smaller diam.	27
$\frac{9}{16}$-in. & ⅝-in.	29
¾-in. and larger	26
Longer than 6 in.:	
All diams.	22
Lag bolts, all diams.:	
6 in. and shorter	30
over 6 in. long	28
Ribbed Necked Carriage	26
Blank	40
Plow	40
Step, Elevator, Tap, and Sleigh Shoe	28
Tire bolts	20
Boiler & Fitting-Up bolts	37

NUTS

H.P. & C.P. Reg. & Heavy Square:		
½-in. and smaller	25	
$\frac{9}{16}$-in. & ⅝-in.	23	
¾-in.-1½-in.	23	
1⅝ in. and larger	16	
H.P. Hex.:	Reg.	Heavy
½-in. & smaller	33	29
$\frac{9}{16}$-in. & ⅝-in.	28	25
¾-in.-1½-in.	25	23
1⅝ in. & larger	17	16
C.P. Hex.:		
½-in. & smaller	33	29
$\frac{9}{16}$-in. & ⅝-in.	30	27
¾-in. & 1½ in.	27	24
1⅝ in. & larger	20	17

SEMIFINISHED NUTS

American Standard

(Per cent off list for less than case or keg quantities)

	Hvy.	Reg.	Lght.
½-in. and smaller	35	41	41
$\frac{9}{16}$-in. & ⅝-in.	30	36	36
¾-in.-1½ in.	27	31	33
1⅝-in. & larger	17	21	..

STEEL STOVE BOLTS

(F.o.b. plant; per cent off list in packages)

Plain finish	63.5 & 10
Plated finishes	50 & 10

HEXAGON CAP SCREWS

(1020 steel; packaged; per cent off list)

6 in. or shorter:	
¼-in. through ⅝-in.	50
¾-in. through 1 in.	43
Longer than 6 in.:	
¼-in. through ⅝-in.	33
¾-in. through 1 in.	13

SQUARE HEAD SET SCREWS

(Packaged; per cent off list)

1 in. diam. x 6 in. and shorter	46
1 in. and smaller diam. x over 6 in.	33

HEADLESS SET SCREWS

(Packaged; per cent off list)

No. 10 and smaller	41
¼-in. diam. & larger	24
N.F. thread, all diams.	18

RIVETS

F.o.b. midwestern plants

Structural ½-in., larger	7.25c
$\frac{7}{16}$-in., under	43 off

Washers, Wrought

F.o.b. shipping point, to jobbers ....Net to $1 off

ELECTRODES

(Threaded, with nipples, unboxed, f.o.b. plant)

GRAPHITE

Inches Diam.	Inches Length	Cents per lb
17,18,20	60,72	16.00
8 to 16	48,60,72	16.50
7	48,60	17.75
6	48,60	19.00
4, 5⅛	40	19.50
3	40	20.50
2½	24,30	21.00
2	24,30	23.00

CARBON

40	100,110	7.50
35	100,110	7.50
30	84,110	7.50
24	72 to 104	7.50
17 to 20	34,90	7.50
14	60,72	8.00
10,12	60	8.25

STAINLESS STEEL

(Cents per pound)

Type	Sheets	C.R. Strip	Bars Wire Structurals
301...	37.50	30.50	28.50
302...	37.50	33.00	28.50
303...	39.50	36.50	31.00
304...	39.50	35.00	30.00
309...	52.00	52.00	41.50
316...	53.00	55.00	46.00
321...	45.50	44.50	34.00
347...	50.00	48.50	38.50
410...	33.00	27.00	23.00
416...	33.50	33.50	23.50
420...	40.50	43.50	28.50
430...	35.50	27.50	23.50
501...	24.00	22.50	11.50
502...	25.00	23.50	12.50

Baltimore, Type 301 through 347 sheet, except 309 E2.
Baltimore, bars, wire and structurals A10.
Brackenridge, Pa., sheets A4
Bridgeville, Pa., bars, wire, sheets & strip, except Type 309 strip quoted 51.00c U4.
Butler, Pa., sheets and strip except Types 303, 309, 416, 420, 501 & 502 A10.
Carnegie, Pa., strip except Type 416; Type 309 strip quoted 51.00c S18.
Cleveland, strip, except Type 309 quoted 51.00c and except Type 416 A7.
Detroit, strip, except Type 309 M1.
Dunkirk, N.Y. bars, wire A4.
Duquesne, Pa., bars C3.
Fort Wayne, Ind., bars and wire, except Types 501 and 502 J6.
Gary, Ind., sheets except Type 416 C3.
Harrison, N. J., strip C18.
Harrison, N. J., Types 302, 304, 316 wire and strip D6.
Massillon, all products, except Type 309 bars, wire & structurals quoted 42.00c. Type 501, 10.50c, Type 502 11.50c R2.
McKeesport, Pa., bars; sheets except Type 416, C3.
McKeesport, Pa., bars & wire except Types 301, 309, 501 & 502; strip Types 410 & 430 only F2.
Middletown, O., sheets and strip, except Types 303, 416, 420, 501 and 502 A10.
Midland, sheets & strip C18.
Munhall, Pa., bars C3.
Pittsburgh, sheets C18.
Reading, Pa., bars & strip except Type 309 bars quoted 41.00c C4.
So. Chicago, Ill., bars & structurals C3.
Syracuse, N. Y., bars wire & structurals C18.
Titusville, Pa., bars U4.
Wallingford, Conn., strip, except 309, W2 quotes ¼-cent higher.
Washington, Pa., bars sheets & strip except Type 309 strip quoted 51.00c J3.
Washington, Pa., Types 301 through 347 sheets & strip as listed except 303 & 309; 316 sheets 58.00c, strip 60.00c W4.
Watervliet, N. Y., structurals & bars A4.
Waukegan, bars & wire A7.
West Leechburg, Pa., strip, except Type 300 quoted 51.00c A4.
Youngstown, strip C8.

COAL, CHEMICALS

Spot, cents per gallon, ovens	
Pure benzol	22.00
Toluol, one deg.	19.00-24.75
Industrial xylol	20.50-26.50
Per ton bulk, ovens	
Sulphate of ammonia	$32-45
Cents per pound, ovens	
Phenol, 40 (carlots, returnable drums)	13.50
Do., less than carlots	14.25
Do., tank cars	12.50

FLUORSPAR

Metallurgical grade, f.o.b. shipping point, in Ill., Ky., net tons, carloads, effective CaF_2 content, 70% or more, $37; less than 60%, $34. Imported, net ton, duty paid, metallurgical grade, $39-$40.

METAL POWDERS

(Per pound, f.ob. shipping point in ton lots for minus 100 mesh)

	Cents
Sponge Iron:	
98+% Fe, carlots	15.00
Swedish, c.i.f. New York, in bags	7.40-8.50
Electrolytic Iron:	
Annealed, 99.5% Fe	39.50
Unannealed, 99+% Fe	33.50
Unannealed 99+% Fe (minus 325 mesh)	48.50
Carbonyl Iron:	
97.9-99.8%, size 5 to 10 microns	70.00-135.00
Aluminum:	
Carlots, freight allowed	27.00
Atomized, 500 lb drums, freight allowed	30.00
Brass, 10-ton lots	23.25-26.25
Copper:	
Electrolytic	27.75
Reduced	27.00
Lead	18.50
Manganese:	
Minus 100-mesh	52.00-55.00
Minus 35 mesh	48.00
Minus 200 mesh	56.00
Nickel unannealed	61.00-66.00
Silicon	34.00-40.00
Solder (plus cost of metal)	8.50
Stainless Steel, 302	75.00
Tin	86.50
Zinc, 10-ton lots	15.25-18.00
	Dollars
Tungsten:	
99%, minus 80 to 200 mesh, freight allowed,	
over 1000 lb	2.90
1000 lb	2.95
less than 1000 lb	3.00
98.8%, minus 65 mesh, freight allowed.	
1000 lb and over	2.90
less than 1000 lb	3.00
Molybdenum:	
99%, minus 80 to 200 mesh,	
over 500 lb	2.25
200 to 500 lb	2.60
less than 200 lb	2.75
82-88%, freight allowed,	
2000 lb and over	2.40
less than 2000 lb	2.45
Chromium, electrolytic 99% Cr min.	3.50

METALLURGICAL COKE

Price per net ton

BEEHIVE OVENS

Connellsvil, fur.	$14.00-14.50
Connellsvl, fdry.	15.50-16.50
New River, foundry	19.00
Wise county, foundry	15.95
Wise county, furnace	15.20

OVEN FOUNDRY COKE

Kearney, N. J., ovens	$22.00
Everett, Mass., ovens	
New England, del.‡	23.40
Chicago, ovens	21.00
Chicago del.	†22.45
Detroit, del.	24.91
Terre Haute, ovens	21.20
Milwaukee, ovens	21.75
Indianapolis, ovens	20.75
Chicago, del.	24.12
Cincinnati, del.	23.67
Detroit, del.	24.65
Ironton, O., ovens	20.40
Cincinnati, del.	22.71
Painesville, O., ovens	21.90
Buffalo, del.	24.02
Cleveland, del.	23.62
Erie, del.	22.04
Birmingham, ovens	19.15
Philadelphia, ovens	21.25
Neville Island, Pa., ovens	21.00
Swedeland, Pa., ovens	21.20
Portsmouth, O., ovens	20.15
Cincinnati, del.	22.71
Detroit, ovens	21.65
Detroit, del.	22.65
Buffalo, del.	24.00
Flint, del.	24.09
Pontiac, del.	23.04
Saginaw, del.	24.40

Includes representative switching charge of: *, $1.05; †, $1.45, one-track charge being $1.20, two tracks $1.40, and three or more tracks $1.50. ‡ Or within $4.15 freight zone from works.

WAREHOUSE STEEL PRODUCTS

(Prices, cents per pound, for delivery within switching limits, subject to extras)

	SHEETS			STRIP		BARS			Standard Structural Shapes	PLATES	
	H.R. 18 Ga., Heavier*	C.R.	Galv. 10 Ga.†	H.R.*	C.R.*	H.R. Rds.	C.F. Rds.	H.R. Alloy 4140§		Carbon	Floor
New York (city)	5.75	6.84	7.25	6.04	...	5.85	6.64	8.60	5.65	5.90	7.34
New York (c'try)	5.55	6.64	7.05	5.84	...	5.65	6.44	8.40	5.45	5.70	7.14
Boston (city) ..	5.93	6.68	7.19	5.98	...	5.80	6.50	8.70	5.75	6.08	7.28
Boston (c'try) .	5.73	6.48	6.99	5.78	...	5.60	6.30	8.50	5.55	5.88	7.08
Phila. (city) ..	6.45	6.60	7.00	5.90	...	5.75	6.46	8.40	5.50	5.70	6.80
Phila. (c'try)..	6.20	6.35	6.75	5.65	...	5.50	6.21	8.15	5.25	5.45	6.55
Balt. (city) ...	5.25	6.44	6.66	5.79	...	5.69	6.39	...	5.69	5.40	7.04
Balt. (c'try) ..	5.05	6.24	6.46	5.59	...	5.49	6.19	...	5.49	5.20	6.84
Norfolk, Va. ..	6.10	...	...	6.30	...	6.15	7.20	...	6.20	6.15	7.55
Wash. (w'hse).	5.46	...	...	6.00	...	5.90	6.62	...	5.90	5.61	7.25
Buffalo (del.)..	5.25	6.00	7.00	5.61	...	5.25	5.95	10.10††[5]	5.35	5.65	6.95
Buffalo (w'hse)	5.05	5.80	6.80	5.41	...	5.05	5.75	9.90††[5]	5.15	5.45	6.75
Pitts. (w'hse)..	5.05	5.80*	6.45-6.70	5.20	6.15	5.00	5.75	9.55††	5.05	5.15	6.40
Detroit (w'hse).	5.33	6.08*	7.09	5.49	...	5.39	6.03	9.86††[5]	5.44	5.59	6.68
Cleveland (del.)	5.25	6.00	7.15	5.44	6.35	5.32	5.95	8.31	5.37	5.52	6.72
Cleve. (w'hse).	5.05	5.80	6.95	5.24	6.15	5.12	5.75	8.16	5.17	5.32	6.52
Cincin. (w'hse).	5.32	5.84	6.44	5.49	...	5.39	6.10	9.90††[5]	5.44	5.59	6.75
Chicago (city) .	5.25	6.00*	6.90	5.30	...	5.20	5.85	9.75††[5]	5.25	5.40	6.60
Chicago (w'hse)	5.05	5.80*	6.70	5.10	...	5.00	5.65	9.55††[5]	5.05	5.20	6.40
Milwaukee(city)	5.39	6.14*	7.04	5.44	...	5.34	6.09	9.89††[5]	5.39	5.54	6.74
Milwau. (c'try).	5.19	5.94*	6.84	5.24	...	5.14	5.89	9.69††[5]	5.19	5.34	6.54
St. Louis (del.).	5.58	6.33	7.23	5.63	...	5.53	6.28	10.08††[5]	5.58	5.73	6.93
St. L. (w'hse).	5.38	6.13	7.03	5.43	...	5.33	6.08	9.88††[5]	5.38	5.53	6.73
Kansas City ..	5.65	6.40	7.30	5.70	...	5.60	6.35	10.10	5.65	5.80	7.00
Omaha, Nebr. .	6.13‡	...	8.33	6.13	...	6.18	6.98	...	6.18	6.38	7.83
Birm'ham (del.)	5.20[10]	5.95	6.30[2]	5.25[10]	...	5.15[10]	6.88	...	5.20[10]	5.35[10]	7.63[10]
Birm'hm(w'hse)	5.05[10]	5.80	6.15[2]	5.10[10]	...	5.00[10]	...	...	5.05[10]	5.20[10]	...
Los Ang. (city)	6.00	7.50	7.03[3]	6.05	8.30	6.00	7.75	...	5.90	6.00	8.20
L. A. (w'hse)..	5.80	7.30	7.50[3]	5.85	8.10	5.80	7.55	...	5.70	5.80	8.00
San Francisco .	6.25[9]	7.60[3]	7.50[2]	6.75[9]	8.25[3]	6.15[9]	7.55	...	6.00[9]	6.15[9]	8.10[9]
Seattle-Tacoma.	6.60	8.15[3]	...	6.85	...	6.35	8.50	10.10	6.20	6.35[7]	8.40[7]

* Prices do not include gage extras; † prices include gage and coating extras, except Birmingham (coating extra excluded) and Los Angeles (gage extra excluded); ‡ includes extra for 10 gage; § as rolled; †† as annealed. Base quantities, 2000 to 9999 lb except as noted: Cold-rolled strip, 2000 lb and over; cold-finished bars, 2000 lb and over; [2]—500 to 1499 lb; [3]—450 to 1499 lb; [5]—1000 to 1999 lb; [7]—300 to 999 lb; [8]—300 to 499 lb; [9]—400 to 9999 lb; [10]—500 to 9999 lb inclusive.

REFRACTORIES

(Prices per 1000 bricks, f.o.b. plant)

FIRE CLAY BRICK

Super Duty: St. Louis, Vandalia, Farber, Mexico, Mo., Olive Hill, Ky., Clearfield, or Curwensville, Pa., Ottawa, Ill., $106. Hard-fired, $142 at above points.

High-Heat Duty: Salina, Pa. $91; Woodbridge N. J., St. Louis, Farber, Vandalia, Mexico, Mo., West Decatur, Orviston, Clearfield, Beach Creek, or Curwensville, Pa., Olive Hill, Hitchins, Haldeman, or Ashland, Ky., Troup, or Athens, Tex., Stevens Pottery, Ga., Portsmouth, or Oak Hill, O., Ottawa, Ill., $86.

Intermediate-Heat Duty: St. Louis, or Vandalia, Mo., West Decatur, Orviston, Beach Creek, or Clearfield, Pa., Olive Hill, Hitchins, or Haldeman, Ky., Athens, or Troup, Tex., Stevens Pottery, Ga., Portsmouth, O., Ottawa, Ill., $80.

Low-Heat Duty: Oak Hill, or Portsmouth, O., Clearfield, Orviston, Pa., Bessemer, Ala., $72; Ottawa, Ill., $70.

LADLE BRICK

Dry Press: Freeport, Merill Station, Clearfield, Pa., Irondale, Wellsville, O., Chester, W. Va., New Cumberland, W. Va., $60.

Wire Cut: Chester, W. Va., Wellsville, O., New Cumberland, W. Va., $58.

MALLEABLE BUNG BRICK

St. Louis, Mo., Olive Hill, Ky., $96; Ottawa, Ill., $90; Beach Creek, Pa., $86.

SILICA BRICK

Mt. Union, Claysburg, or Sproul, Pa., Portsmouth, O., Ensley, Ala., $86; Hays, Pa., $91; Joliet or Rockdale, Ill., E. Chicago, Ind., $95; Lehi, Utah, Los Angeles, $101.

Eastern Silica Coke Oven Shapes (net ton): Claysburg, Mt. Union, Sproul, Pa., Birmingham, $84.

Illinois Silica Coke Oven Shapes (net ton): Joliet or Rockdale, Ill., E. Chicago, Ind., Hays, Pa., $85.

BASIC BRICK

(Base prices per net ton; f.o.b. works, Baltimore or Chester, Pa.)

Burned chrome brick, $66; chemical-bonded chrome brick, $69; magnesite brick, $91; chemical-bonded magnesite, $80.

MAGNESITE

(Base prices per net ton, f.o.b. works, Chewelah, Wash.)

Domestic dead-burned, ⅜" grains; bulk, $33; single paper bags, $38.

DOLOMITE

(Base prices per net ton)

Domestic, dead-burned bulk; Billmeyer, Blue Bell, Williams, Plymouth Meeting, Pa., Millville, W. Va., Narlo, Millersville, Martin, Gibsonburg, Woodville, O., $12.25; Thornton, McCook, Ill., $12.35; Dolly Siding, Bonne Terre, Mo., $12.45.

ORES

LAKE SUPERIOR IRON ORE

Gross ton, 51½% (natural), lower lake ports. After Jan. 25, 1950, increases or decreases, if any, in upper lake rail freight, dock handling charges and taxes thereon are for buyer's account.

Old range bessemer	$8.10
Old range nonbessemer	7.95
Mesabi bessemer	7.85
Mesabi nonbessemer	7.70
High phosphorus	7.70

EASTERN LOCAL ORE

Cents per unit, del E. Pa.

Foundry and basic 56.62% concentrates contract	16.00

FOREIGN ORE

Cents per unit, c.i.f. Atlantic ports

Swedish basic, 60 to 68%:	
Spot	17.00
Long-term contract	15.00
North African hematites	15.75
Brazilian iron ore, 68-69%	18.00

TUNGSTEN ORE

Wolframite, scheelite, net ton unit, duty paid	$20-22

MANGANESE ORE

Long term contracts, nominal; nearby, 48%, duty paid, 79.8c-81.8c per long ton unit, c.i.f. U. S. ports; prices on lower grades adjusted to manganese content and impurities.

CHROME ORE

Gross ton, f.o.b. cars, New York, Philadelphia, Baltimore, Charleston, S. C., plus ocean freight differential for delivery to Portland, Oreg., or Tacoma, Wash.

Indian and African	
48% 2.8:1	$32.50
48% 3:1	35.00-36.00
48% no ratio	26.00
South African Transvaal	
44% no ratio	$17.00-18.00
45% no ratio	17.30-18.30
48% no ratio	26.00
50% no ratio	27.00-27.50
Brazilian	
44% 2.5:1 lump	$32.00
Rhodesian	
45% no ratio	$20.00-21.00
48% no ratio	26.00
48% 3:1 lump	35.00-36.00
Domestic—rail nearest seller	
48% 3:1	$39.00

MOLYBDENUM

Sulphide concentrates per lb, molybdenum content, mines	$0.90

FERROALLOYS

MANGANESE ALLOYS

Spiegeleisen: (19-21% Mn, 1-3% Si), Carlot per gross ton, $65, Palmerton, Pa.; $66, Pittsburgh and Chicago; (16% to 19% Mn) $1 per ton lower.

Standard Ferromanganese: (Mn 78-82%, C 7% approx.) Carload, lump, bulk $172 per gross ton of alloy, cl., packed, $184; gross tons lots, packed, $199; less gross ton lot, packed, $216; f.o.b. Alloy, W. Va., Niagara Falls, N. Y., or Welland, Ont. Base price: $174, f.o.b. Birmingham and Johnstown, Pa., furnaces; $172, Sheridan, Pa.; $175, Etna, Pa. Shipment from Pacific Coast warehouses by one seller add $33 to above prices, f.o.b. Los Angeles, San Francisco, Portland, Oreg. Shipment from Chicago warehouse, ton lots, $214; less gross ton lots, $231 f.o.b. Chicago. Add or subtract $2.15 for each 1% or fraction thereof, of contained manganese over 82% and under 78%, respectively.

Low-Carbon Ferromanganese, Regular Grade: (Mn 80-85%). Carload, lump, bulk, max. 0.10% C, 24.75c per lb of contained Mn, carload packed 25.5c, ton lot 26.6c, less ton 27.8c. Delivered. Deduct 0.5c for max, 0.15% C grade from above prices, 1c for max. 0.30% C, 1.5c for max. 0.50% C, and 4.5c for max. 75% C—max. 7% Si. **Special Grade:** (Mn 90% approx., C 0.07% max., P 0.06% max.). Add 0.5c to above prices. Spot, add 0.25c.

Medium-Carbon Ferromanganese: (Mn 80-85%, C 1.5% max., Si 1.5% max.). Carload, lump, bulk 18.15c per lb of contained Mn, carload packed 18.9c, ton lot 20.0c, less ton 21.2c. Delivered. Spot, add 0.25c.

Manganese Metal, 2" x D (Mn 96% min., Fe 2% max., Si 1% max., C 0.2% max.): Carload lump bulk, 29c per lb of metal; packed, 35.5c; ton lot 31.25c, less ton lot 33.25c. Delivered. Spot, add 2c.

Manganese Electrolytic: Less than 250 lb. 35c; 250 lb to 1999 lb, 32c; 2000 to 39,999 lb, 30c; 40,000 lb or more, 28c. Premium for hydrogen-removed metal 1.5c per pound, f.o.b. cars Knoxville, Tenn. Freight allowed to St. Louis or to any point east of Mississippi.

Silicomanganese: (Mn 65-68%). Contract, lump, bulk, 1.50% C grade, 18-20% Si, 8.95c per lb of alloy, carload packed, 9.70c, ton lot 10.60c, less ton 11.60c. Freight allowed. For 2% C grade, Si 15-17%, deduct 0.2c from above prices. Spot, add 0.25c.

CHROMIUM ALOYS

High-Carbon Ferrochrome: Contract, c.l., lump, bulk, 20.5c per lb of contained Cr. c.l., packed 21.4c, ton lot 22.55c, less ton 23.95c. Delivered: Spot, add 0.25c.

"SM" High-Carbon Ferrochrome: (Cr 60-65%, Si 4-6%, Mn 4-6%, C 4-6%). Add 1.1c to high-carbon ferrochrome prices.

(*Please turn to page* 148)

Copper Advances to 20.50c

Rise follows period of steadily tightening supplies with some consumers paying premium prices for Japanese metal to augment supplies available from domestic sources

New York—A leading producer advanced copper prices 1 cent a pound to the basis of 20.50c, delivered Connecticut Valley, effective May 18. The price rise, the first since Apr. 18, followed a firming of export copper to 19.67½c, f.a.s. New York.

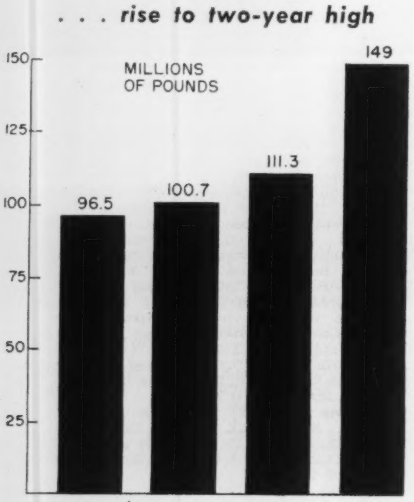
The steady tightening in copper supplies had forced some American industrial users to pay premium prices for Japanese copper. They were unable to cover their first-half requirements fully from domestic sources and paid the equivalent of 20.12½c for Japanese copper. This metal is refined copper cathodes, a type which normally is priced ⅛-cent a pound below the domestic electrolytic refined copper price.

April deliveries of copper to domestic consumers, other than government, reached 101,729 tons, a decline, due to tight supplies, from the 123,030 tons delivered in March. About 21,000 tons went to stockpile during April and stocks in the hands of domestic producers dropped to only 57,028 tons.

Fabricators of copper and copper-base alloy products are advancing their price schedules again, to meet the higher price for copper, lead and zinc.

Aluminum Products Shipments

. . . rise to two-year high



Washington—Average daily shipments of aluminum wrought products during March were 11 per cent above those in February and 19 per cent above those in March, 1949, reports the Census Bureau.

Net shipments totaled 149 million pounds in March, the highest total for any month since March, 1948, when they came to 159 million. They totaled 111 million pounds in February, 1950, and 125 million in March, 1949. March shipments included: 107,367,000 pounds of plate, sheet and strip; 20,972,000 pounds of rolled structural shapes, rod, bar, wire; 19,523,000 pounds of extruded shapes, tube blooms, tubing; 1,169,000 pounds of powder, flake and paste.

Shipments of magnesium wrought products during March, on an average working-day basis, were 6 per cent lower than in February, 1950, but 29 per cent higher than in March, 1949. They totaled 868,000 pounds in March, 761,000 pounds in February and 672,000 pounds in March, 1949.

Lead Demand Continues Active

New York—Advances posted in lead earlier this month have not dampened buying interest. Consumers are placing a satisfactory volume of business with leading producers for both May and June delivery. Prices are unchanged on the basis of 11.80c, St. Louis.

Zinc Price Tone Remains Strong

New York—Undertone of the zinc market remains strong. Supplies are far below actual demands, especially in special high grade zinc. Die casters continue to exert strong pressure for additional tonnages of the latter grade.

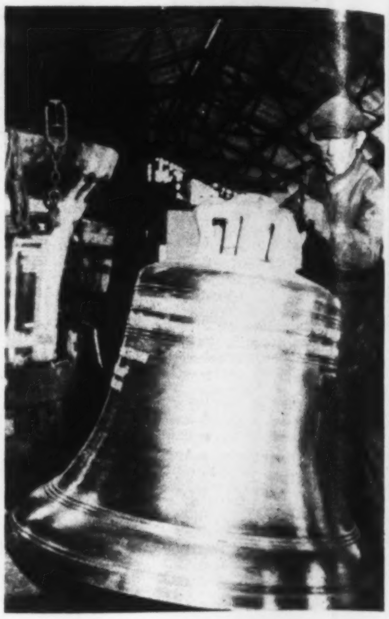
Galvanizers Honor Sendzimir

Toronto, Ont.—Tadeusz Sendzimir, vice president of Armzen Co. and inventor of the Sendzimir process of continuous galvanizing, was given the first annual award of the Galvanizers Committee, which is sponsored by the American Zinc Institute, at the dinner session of the 23rd meeting of the Committee here May 18. The presentation of a bronze plaque, suitably inscribed, marked the award to Mr. Sendzimir for fundamental achievements in the art of galvanizing sheets.

Brass Mill Outlook Is Excellent

Hot Springs, Va.—Demand for copper and brass mill products has snapped back to the average level of 1948 following a setback in 1949, it was reported at the annual meeting of the Copper & Brass Research Association here last week. Outlook for the rest of 1950 is excellent, based on high rates of activity in the automotive, household appliance and building fields.

The association elected three new vice presidents, Wendell Cross, Thinsheet Metals Co., Waterbury, Conn.; J. P. Lally, C. G. Hussey & Co., Pittsburgh, and H. L. Marion, Phelps-Dodge Copper Products Co., New York. W. M. Goss, Scovill Mfg. Co., Waterbury, continues as president; J. A. Doucett, Revere Copper & Brass Inc., New York, and S. H. Perry, Chase Brass & Copper Co., Waterbury, as vice presidents; F. L. Riggin, Mueller Brass Co., Port Huron, Mich., treasurer; T. E. Veltfort, manager, and B. C. Caddle, secretary.



FOR BOND DRIVE: The Liberty Bells for the Independence Bond Drive were made at the Paccard Foundries in Annecy, France. Fifty-two of them were cast in exact duplication of the original. They were made of bronze; their weight, 2000 pounds apiece. Here, one of the French workmen is shown putting some finishing touches on one of the bells while they were in Annecy

Closes Zinc Mining Operations

New York—Universal Exploration Co., this city, has closed its zinc mining operations near Talcville, N. Y. The firm is a subsidiary of U.S. Steel Corp. and began its mining operations in northern New York in 1940.

Will Develop Cobalt Property

New York—Howe Sound Co., this city, is developing cobalt property in the Blackbird district in Idaho and plans to construct an ore concentrating plant to handle 600 tons of ore daily. Completion is expected within a year. A small refinery to handle the concentrates will be erected in the Garfield area, about 20 miles from Salt Lake City, Utah.

Chase Brass Schedules Vacations

Waterbury, Conn.—Chase Brass & Copper Co. Inc., this city, will close its mills for a two weeks' vacation period on the following schedule: Waterbury mill, June 26 to July 10; Cleveland mills, July 3 to July 17; insect screening and wire cloth mill, Hungerford, Pa., July 3 to July 17; Kennecott Wire & Cable Co. mill, Phillipsdale, R. I., July 3 to July 17.

While there will be no actual production during the shutdown, offices of the four plants will operate as usual. All of the company's 23 warehouses and sales offices throughout the country will remain open during these periods, and the warehouses will continue to make shipment from stock.

NONFERROUS METALS

(Cents per pound, carlots, except as otherwise noted)

Primary Metals

Copper: Electrolytic 20.50c, Conn. Valley; Lake 20.62½c, Conn. Valey.

Brass Ingot: 85-5-5-5 (No. 115) 18.75c; 88-10-2 (No. 215) 25.75c; 80-10-10 (No. 305) 22.25c; No. 1 yellow (No. 405) 16.50c.

Zinc: Prime western 12.00c; brass special 12.25c, intermediate 12.50c, East St. Louis; high grade 13.10c, delivered.

Lead: Common 11.80c; chemical 11.90c; corroding 11.90c, St. Louis.

Primary Aluminum: 99% plus, ingots 17.00c, pigs 16.00c. Base prices for 10,000 lb and over, f.o.b. shipping point.

Secondary Aluminum: Piston alloys 17.00c; No. 12 foundry alloy (No. 2 grade) 16.25-16.50c; steel deoxidizing grades, notch bars, granulated or shot: Grade 1, 17.50-17.75c; grade 2, 16.75-17.00c; grade 3, 15.50-15.75c; grade 4, 14.75-15.00c. Prices include freight at carload rate up to 75 cents per 100 lb.

Magnesium: Commercially pure (99.8%) standard ingots, 10,000 lb and over, 20.50c, f.o.b. Freeport, Tex.

Tin: Grade A, prompt del., 77.50c; May del. 77.50c; June del. 77.00c; July del. 76.75c; Aug. del. 76.62½c.

Antimony: American 99-99.8% and over but not meeting specifications below 24.50c; 99.8% and over (arsenic 0.05% max.; other impurities 0.1% max.) 25.00c; f.o.b. Laredo, Tex., for bulk shipments. Foreign, 99%: Chinese and Yugoslavian, 22.00c; English and Belgian, prompt, 23.00c, New York.

Nickel: Electrolytic cathodes, 99.9%, base sizes at refinery, unpacked, 40.00c; 25-lb pigs, 42.50c; "XX" nickel shot, 43.50c; "F" nickel shot or ingots, for addition to cast iron, 40.50c. Prices include import duty.

Mercury: Open market, spot, New York $71-$74 per 76-lb flask.

Beryllium-Copper: 3.75-4.25% Be, $24.50 per lb contained Be.

Cadmium: "Regular" straight or flat forms, $2 del.; special or patented shapes, $2.15.

Cobalt: 97-99%, $1.80 per lb for 550 lb (keg); $1.80 per lb for 100 lb (case); $1.87 per lb under 100 lb.

Gold: U. S. Treasury, $35 per ounce.

Silver: Open market, New York, 72.75c per oz.

Platinum: $66-$69 per ounce.

Palladium: $24 per troy ounce.
Iridium: $100 per troy ounce.
Titanium (sponge form): $5 per pound.

Rolled, Drawn, Extruded Products

COPPER AND BRASS

(Base prices, cents per pound, f.o.b. mill; based on 19.50-cent copper.)

Sheet: Copper 34.43; yellow brass 31.19; commercial bronze, 95%, 34.38; 90%, 33.93; red brass, 85% 32.96; 80%, 32.52; best quality, 32.04; nickel silver, 18%, 44.49; phosphor-bronze, grade A, 5% 52.21.

Rods: Copper, hot-rolled 30.28; cold-drawn 31.53; yellow brass free cutting, 30.88; commercial bronze, 95% 34.07; 90% 33.62; red brass 85% 32.65; 80% 32.21.

Seamless Tubing: Copper 34.47; yellow brass 34.20; commercial bronze 90% 36.59; red brass 85% 35.87; 80% 35.43.

Wire: Yellow brass 31.48; commercial bronze, 95% 34.67; 90% 34.22; red brass, 85% 33.25; 80% 32.81; best quality brass 32.33.

Copper Wire: Bare soft, f.o.b., eastern mills, 100,000 lb lots 23.54c, l.c.l. 24.17, c.l. 23.67; weatherproof, f.o.b. eastern mills, 100,000 lb lots 25.60, l.c.l. 26.35, c.l. 25.85; magnet, delivered, 15,000 lb or more 29.50, l.c.l. 30.25.

ALUMINUM

Sheets and Circles: 2S and 3S mill finish c.l.

Thickness Range, Inches	Widths or Diameters, In., Incl.	Flat Sheet Base*	Coiled Sheet Base	Coiled Sheet Circle† Base
0.249-0.136	12-48	26.9	...	...
0.135-0.096	12-48	27.4	...	...
0.095-0.077	12-48	27.9	26.0	29.6
0.076-0.068	12-48	28.5	26.2	29.8
0.067-0.061	12-48	28.5	26.2	29.8
0.060-0.048	12-48	28.7	26.4	30.1
0.047-0.038	12-48	29.1	26.6	30.4
0.037-0.030	12-48	29.5	27.0	30.9
0.029-0.024	12-48	29.9	27.3	31.3
0.023-0.019	12-36	30.5	27.7	31.8
0.018-0.017	12-36	31.1	28.3	32.6
0.016-0.015	12-36	31.8	28.9	33.5
0.014	12-24	32.7	29.7	34.6
0.013-0.012	12-24	33.6	30.4	35.5
0.011	12-24	34.6	31.3	36.7
0.010-0.0095	12-24	35.6	32.3	38.0
0.009-0.0085	12-24	36.8	33.4	39.5
0.008-0.0075	12-24	38.1	34.6	41.1
0.007	12-18	39.5	35.9	42.9
0.006	12-18	41.0	37.2	47.0

* Minimum length, 60 inches. † Maximum diameter, 24 inches.

Screw Machine Stock: 5000 lb and over.

Diam. (in.) or distance across flats	—Round— R317-T4, 17S-T4	—Hexagonal— R317-T4	17S-T4
0.125	48.0	....	....
0.156-0.203	41.0	....	....
0.219-0.313	38.0	....	....
0.344	37.0	....	47.0
0.375	36.5	45.5	44.0
0.406	36.5	....	....
0.438	36.5	45.5	44.0
0.469	36.5	....	....
0.500	36.5	45.5	44.0
0.531	36.5	....	....
0.563	36.5	....	41.5
0.594	36.5	....	....
0.625	36.5	43.0	41.5
0.656	36.5	....	....
0.688	36.5	....	41.5
0.750-1.000	35.5	40.5	39.0
1.063	35.5	....	37.5
1.125-1.500	34.5	39.0	37.5
1.563	34.5	....	36.5
1.625	33.5	....	36.5
1.688-2.000	33.5	....	....
2.125-2.500	32.5	....	....
2.625-3.375	31.5	....	....

LEAD

(Prices to jobbers, f.o.b. Buffalo, Cleveland, Pittsburgh) Sheets: Full rolls, 140 sq ft or more, $17.00 per cwt; add 50c cwt, 10 sq ft to 140 sq ft. Pipe: Full coils, $17.00 per cwt. Traps and bends; List price plus 45%.

ZINC

Sheets, 17.75c f.o.b. mill, 36,000 lb and over. Ribbon zinc in coils, 17.00c, f.o.b. mill, 36,000 lb and over. Plates, not over 12-in., 16.00c; over 12-in., 17.00c.

NICKEL

(Base prices f.o.b. mill)

Sheets, cold-rolled, 60.00c. Strip, cold-rolled, 66.00c. Rods and shapes, 56.00c. Plates 58.00c. Seamless tubes, 89.00c.

MONEL

(Base prices, f.o.b. mill)

Sheets, cold-rolled 47.00c; Strip, cold-rolled, 50.00c. Rods and shapes, 45.00c. Plates, 46.00c. Seamless tubes, 80.00c. Shot and blocks, 40.00c.

MAGNESIUM

Extruded Rounds, 12 in. long, 1.312 in. in diameter, less than 25 lb. 52.00-56.00c; 25 to 99 lb, 42.00-46.00c; 100 lb to 4000 lb, 35.00-36.00c.

Plating Materials

Chromic Acid: 99.9% flake, f.o.b. Philadelphia, carloads, 25.50c; 5 tons and over 26.00c; 1 to 5 tons, 26.50c; less than 1 ton 27.00c.
Copper Anodes: Base 2000 to 5000 lb; f.o.b. shipping point, freight allowed; Flat untrimmed 29.84c; oval 29.34c; cast 27.87½c.
Copper Cyanide: 70-71% Cu, 100-lb drums, 1000 lb 46.50c, under 1000 lb 48.50c f.o.b. Niagara Falls, N. Y.
Sodium Cyanide: 96-98%, ½-oz ball, in 200 lb drums, 1 to 900 lb, 18.00c; 1000 to 19,000 lb, 17.00c, f.o.b. Niagara Falls, N. Y. Packaged in 100 lb drums add ½-cent.
Copper Carbonate: 54-56% metallic Cu; 50 lb bags, up to 250 lb, 26.25c; over 250 lb, 25.25c, f.o.b. Cleveland.
Nickel Anodes: Rolled oval, carbonized, carloads, 56.00c; 10,000 to 30,000 lb, 57.00c; 3000 to 10,000 lb, 58.00c; 500 to 3000 lb, 59.00c; 100 to 500 lb, 61.00c; under 100 lb, 64.00c; f.o.b. Cleveland.
Nickel Chloride: 100-lb kegs, 26.50c; 400-lb bbl. 24.50c, f.o.b. Cleveland, freight allowed on barrels, or 4 or more kegs.
Tin Anodes: Bar, 1000 lb and over 93.00c, 500 to 999 lb, 93.5c; 200 to 499 lb, 94.00c; less than 200 lb, 95.5c, ball, 1000 lb and over, 95.25c; 500 to 999 lb, 95.75c; 200 to 499 lb 96.25c; less than 200 lb, 97.75c, f.o.b. Sewaren, N. J.
Sodium Stannate: 25 lb cans only, less than 100 lb, to consumers 59.2c, 100 or 300 lb drums only, 100 to 500 lb, 50.9c; 600 to 1900 lb, 48.5c; 2000 to 9900 lb, 46.8c, f.o.b. Sewaren, N. J. Freight not exceeding St. Louis rate allowed.
Zinc Cyanide: 100 lb drums, less than 10 drums 40.00c, 10 or more drums 38.00c, f.o.b. Niagara Falls, N. Y.; 41.25c and 39.25c, respectively, del. Cleveland or Philadelphia.
Stannous Sulphate: 100 lb kegs or 400 lb bbl, less than 2000 lb 84.50c; more than 2000 lb, 82.50c, f.o.b. Carteret, N. J.
Stannous Chloride (Anhydrous): In 400 lb bbl, 70.80c; 100 lb kegs 71.80c, f.o.b. Carteret, N. J.

Scrap Metals

BRASS MILL ALLOWANCES

Prices in cents per pound for less than 15,000 lb, f.o.b. shipping point.

	Clean Heavy	Rod Ends	Clean Turnings
Copper	16.50	16.50	15.75
Yellow Brass	13.75	13.50	12.50
Commercial Bronze			
95%	15.50	15.25	14.75
90%	15.375	15.125	14.625
Red brass			
85%	15.125	14.875	14.375
80%	14.875	14.625	14.125
Best Quality(71-80%)	14.50	14.25	13.75
Muntz metal	12.75	12.50	12.00
Nickel, silver, 10%	15.62½	15.37½	7.81¼
Phos. bronze, A	16.75	16.50	15.50
Naval brass	13.12½	12.87½	12.37½
Manganese bronze	13.12½	12.87½	12.25

BRASS INGOT MAKERS' BUYING PRICES

(Cents per pound, delivered eastern refineries, carload lots)

No. 1 copper 16.50; No. 2 copper 15.25; light copper 14.25; composition red brass 13.75; radiators 11.00; heavy yellow brass 10.50.

REFINERS' BUYING PRICES

(Cents per pound, delivered refinery, carload lots)

No. 1 copper 16.25; No. 2 copper 15.25; light copper 14.25; refinery brass (60% copper) per dry copper content 15.25.

DEALERS' BUYING PRICES

(Cents per pound, New York, in ton lots)

Copper and brass: Heavy copper and wire, No. 1 15.00-15.25; No. 2 14.00-14.25;; light copper 13.00-13.25; No. 1 composition red brass 12.00-12.25; No. 1 composition turnings 11.50-11.75; mixed brass turnings 7.50-7.75; new brass clippings 11.25-11.75; No. 1 brass rod turnings 10.00-10.25; light brass 7.25-7.50; heavy yellow brass 8.25-8.50; new brass rod ends 10.50-10.75; auto radiators, unsweated 9.50-9.75; cocks and faucets, 10.25-10.50; brass pipe 10.50-10.75.

Lead: Heavy 9.50-9.75; battery plates 5.25-5.50; linotype and stereotype 11.50-11.75; electrotype 9.75-10.00; mixed babbitt 9.75-10.00.

Zinc: Old zinc 600-6.25; new die cast scrap 6.00-6.25; old die cast scrap 4.25-4.50.

Tin: No. 1 pewter 39.00-41.00; block tin pipe 60.00-62.00; No. 1 babbitt 30.00-32.00.

Aluminum: Clippings 2S 10.00-10.50; old sheets 7.00-7.50; crankcase 7.00-7.50; borings and turnings 4.00.

DAILY PRICE RECORD

1950	Copper	Lead	Zinc	Tin	Aluminum	Antimony	Nickel	Silver
May 17-18	20.50	11.80	12.00	77.50	17.00	24.50	40.00	72.75
May 15-16	19.50	11.80	12.00	77.375	17.00	24.50	40.00	72.75
May 11-13	19.50	11.80	12.00	77.625	17.00	24.50	40.00	72.75
May 10	19.50	11.30	12.00	77.50	17.00	24.50	40.00	72.75
May 9	19.50	11.05	12.00	77.125	17.00	24.50	40.00	72.75
May 8	19.50	11.05	11.50	76.875	17.00	24.50	40.00	72.75
May 4-6	19.50	11.05	11.50	76.75	17.00	24.50	40.00	72.75
May 3	19.50	10.80	11.25	77.25	17.00	24.50	40.00	71.75

NOTE: Copper: Electrolytic, del. Conn. Valley; Lead, common grade, del. E. St. Louis; Zinc, prime western, del. St. Louis; Tin, Straits, del. New York; Aluminum primary ingots, 99%, del.; Antimony, bulk, f.o.b. Laredo, Tex.; Nickel, electrolytic cathodes, 99.9%, base sizes at refinery unpacked; Silver, open market, New York. Prices, cents per pound; except silver, cents per ounce.

IRON AND STEEL SCRAP

Consumer prices, except as otherwise noted, including brokers' commissions, as reported to STEEL, May 18, 1950; gross tons except as noted. Changes shown in italics.

STEELMAKING SCRAP COMPOSITE

May 18	$33.83
May 11	31.67
Apr. 1950	29.40
May 1949	22.29
May 1945	19.13

Based on No. 1 heavy melting grade at Pittsburgh, Chicago and eastern Pennsylvania.

PITTSBURGH

No. 1 Heavy Melt.	*$38.00*
No. 2 Heavy Melt.	*32.00*
No. 1 Busheling	*38.00*
No. 1 Bundles	*39.00*
No. 2 Bundles	*29.00*
No. 3 Bundles	*27.00-27.50**
Heavy Turnings	*34.50-35.00*
Machine Shop Turnings	*27.00-28.00†*
Mixed Borings, Turnings	*27.00-28.00†*
Short Shovel Turnings	*28.50-29.00*
Cast Iron Borings	*27.00*
Low Phos. Steel	*39.50-40.00*

Cast Iron Grades

No. 1 Cupola Cast	37.00-38.00
No. 1 Machinery Cast	41.00-42.00
Charging Box Cast	37.00-38.00
Heavy Breakable Cast	33.50-34.50

Railroad Scrap*

No. 1 R.R. Heavy Melt.	*40.00-40.50‡*
Rails, Random Lengths	40.00-41.00
Rails, 2 ft. and under	*42.50-43.00*
Rails, 18 in. and under	*43.50-44.00*
Railroad Specialties	*41.00-41.50*
Axles	*38.00-39.00*
Angles, Splice Bars	*41.00-42.00**

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* Nominal.
† Crushers' buying prices.
‡ Brokers' buying prices.

CLEVELAND

No. 1 Heavy Melt. Steel	*$34.00-34.50*
No. 2 Heavy Melt. Steel	*32.00-32.50*
No. 1 Busheling	*34.00-34.50*
No. 1 Bundles	*34.00-34.50*
No. 2 Bundles	*28.50-29.00*
Machine Shop Turnings	*23.00-23.50*
Mixed Borings, Turnings	*25.50-26.00*
Short Shovel Turnings	*25.50-26.00*
Cast Iron Borings	*25.50-26.00*
Low Phos.	*34.00-34.50*

Cast Iron Grades

No. 1 Cupola	45.00-45.50
Charging Box Cast	39.50-40.50
Stove Plate	37.00-38.00
Heavy Breakable Cast	34.00-34.50
Unstripped Motor Blocks	32.50-33.50
Brake Shoes	30.50-31.50
Clean Auto Cast	45.50-46.50
No. 1 Wheels	38.50-39.00
Burnt Cast	34.50-35.00

Railroad Scrap

No. 1 R.R. Heavy Melt.	*39.00-40.00*
R.R. Malleable	40.50-41.00
Rails, 3 ft and under	43.00-44.00
Rails, 18 in. and under	45.00-46.00
Rails, Random Lengths	40.00-41.00
Cast Steel	36.00-37.00
Railroad Specialties	37.00-37.50
Uncut Tires	38.00-39.00
Angles, Splice Bars	42.50-43.00

VALLEY

No. 1 Heavy Melt. Steel	*$37.50-38.00*
No. 2 Heavy Melt. Steel	*35.00-35.50*
No. 1 Bundles	*37.00-37.50*
No. 2 Bundles	*30.50-31.00*
Machine Shop Turnings	*25.00-25.50*
Short Shovel Turnings	*27.00-27.50*
Cast Iron Borings	*27.00-27.50*
Low Phos.	*37.50-38.00*

Railroad Scrap

No. 1 R.R. Heavy Melt.	*38.50-39.00*

PHILADELPHIA

No. 1 Heavy Melt. Steel	*$29.00**
No. 2 Heavy Melt. Steel	*27.00**
No. 1 Busheling	*28.00**
No. 1 Bundles	*29.00**
No. 2 Bundles	*23.50**
Machine Shop Turnings	*20.00*
Short Shovel Turnings	21.00-22.00
Mixed Borings, Turnings	*18.00-18.50*
Low Phos. Punchings and Plate, elec. fur. grade	*34.00-35.00*
Low Phos. Plate, 5 ft & Under	*34.00-35.00*
Elec. Furnace Bundles	*29.00*
Heavy Turnings	*29.00*
No. 1 Chemical Borings	30.00
Knuckles and couplers	*35.00-36.00*
Steel car wheels	*35.00-36.00*

Cast Iron Grades

No. 1 Cupola Cast	34.00-35.00
No. 1 Machinery Cast	38.50-39.00
No. 1 Yard Cast	34.00
Charging Box Cast	36.00
Heavy Breakable Cast	36.00
Unstripped Motor Blocks	29.00
Clean Auto Cast	38.50-39.00
No. 1 Wheels	*41.00*
Malleable	41.00-42.00

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* Nominal.

CINCINNATI

No. 1 Heavy Melt. Steel	$32.00
No. 2 Heavy Melt. Steel	27.00
No. 1 Busheling	32.00
No. 1 Bundles	32.00
No. 2 Black Bundles	26.00
No. 3 Bundles	23.00
Machine Shop Turnings	18.00
Short Shovel Turnings	21.00
Mixed Borings, Turnings	20.00
Cast Iron Borings	21.00

Cast Iron Grades

No. 1 Cupola Cast	45.00
Charging Box Cast	36.00
Stove Plate	32.00
Heavy Breakable Cast	37.50
Unstripped Motor Blocks	27.00
Brake Shoes	25.00
Clean Auto Cast	45.00
Drop Broken Cast	46.50

Railroad Scrap

No. 1 R.R. Heavy Melt.	34.00
R.R. Malleable	38.00
Rails, Rerolling	44.00
Rails, Random Lengths	40.00
Rails, 18 in. and under	48.50

DETROIT

(Brokers' buying prices, f.o.b. shipping point)

No. 2 Heavy Melt. Steel	*$25.50-26.50*
No. 1 Bundles	*34.50-35.50*
No. 2 Bundles	*24.00-24.50*
No. 1 Busheling	33.50-34.00
Machine Shop Turnings	*19.50-20.00*
Forge Flashings	*30.00-30.50*
Short Shovel Turnings	23.00-23.50
Cast Iron Borings	23.00-23.50
Punchings & Plate Scrap	33.50-34.00

Cast Iron Grades

No. 1 Cupola Cast	38.00-39.00
Heavy Breakable Cast	33.00-34.00
Clean Auto Cast	43.00-44.00

BUFFALO

No. 1 Heavy Melt. Steel	*$31.50-32.00*
No. 2 Heavy Melt. Steel	*29.50-30.00*
No. 1 Bushelings	*29.50-30.00*
No. 1 Bundles	*30.50-31.00*
No. 2 Bundles	*28.00-28.50*
Machine Shop Turnings	*22.50-23.00*
Mixed Borings, Turnings	*25.50-26.00*
Cast Iron Borings	*25.50-26.00*
Short Shovelings	*26.00-26.50*
Low Phos.	*32.50-33.00*

Cast Iron Grades

No. 1 Machinery	*38.00-38.50*
No. 1 Cupola	*35.50-36.00*
Stove Plate	33.50-34.50
Malleable	34.50-35.00

Railroad Scrap

Rails, 2 ft. and under	38.00-39.00
Scrap rails	35.00-35.50
Specialties	35.00-36.00

NEW YORK

(Brokers' buying prices f.o.b. shipping point)

No. 1 Heavy Melt. Steel	*$27.50-28.00*
No. 2 Heavy Melt. Steel	*22.50-23.00*
No. 1 Busheling	*23.50-24.00*
No. 1 Bundles	*27.50-28.00*
No. 2 Bundles	*21.00-21.50*
Machine Shop Turnings	15.00-15.50
Mixed Borings, Turnings	15.00-15.50
Short Shovel Turnings	*16.50-17.00*
Punchings & Plate Scrap	*28.00-29.00*
Low Phos. Plate, 5 ft & under	*28.00-29.00*
Elec. Furnace Bundles	*27.50-28.00*

Cast Iron Grades

No. 1 Cupola Cast	28.00-28.50
No. 1 Machinery	29.50-30.50
Charging Box Cast	29.00-30.00
Heavy Breakable	29.00-30.00
Unstripped Motor Blocks	22.00-22.50
Malleable	35.50

BOSTON

(F.o.b. shipping point)

No. 1 Heavy Melt. Steel	*$26.00-27.00*
No. 2 Heavy Melt. Steel	21.00-21.50
No. 1 Bundles	*26.00-27.00*
No. 1 Busheling	*25.00-26.00*
Machine Shop Turnings	15.50-16.00
Mixed Borings, Turnings	15.50-16.00
Short Shovel Turnings	18.00-18.50
Bar Crops and Plate	26.50-27.00
Punchings & Plate Scrap	26.50-27.00
Chemical Borings	19.50-20.00

Cast Iron Grades

No. 1 Cupola Cast	*27.00-28.00*
Mixed Cast	26.50-27.00
Heavy Breakable Cast	*26.50-27.50*
Stove Plate	25.00-26.00

CHICAGO

No. 1 Heavy Melt. Steel	*$34.00-35.00*
No. 2 Heavy Melt. Steel	*31.00-32.00*
No. 1 Bundles	*34.00-35.00*
No. 2 Bundles	*26.00-27.00*
Machine Shop Turnings	*21.00-22.00*
Mixed Borings, Turnings	*22.00-23.00*
Short Shovel Turnings	23.00-24.00
Cast Iron Borings	*22.00-23.00*
Low Phos.	*37.00-38.00*
Elec. Furnace Bundles	*33.00-34.00*
Heavy Turnings	*26.00-27.00*
Cut Structurals	*35.00-36.00*

Cast Iron Grades

No. 1 Cupola Cast	42.00-43.00
Clean Auto Cast	43.00-44.00
No. 1 Wheels	37.00-38.00
Stove Plate	32.50-33.50

Railroad Scrap

No. 1 R.R. Heavy Melt.	*36.00-37.00*
Malleable	42.50-43.50
Rails, Rerolling	48.00-49.00
Rails, Random Lengths	38.00-39.00
Rails, 2 ft and under	44.00-45.00
Rails, 18 in. and under	45.00-46.00
Railroad Specialties	*37.00-38.00*
Angles, Splice Bars	39.00-40.00

BIRMINGHAM

No. 1 Heavy Melt. Steel	$26.00
No. 2 Heavy Melt. Steel	24.00
No. 1 Busheling	25.00
No. 2 Bundles	22.00
Machine Shop Turnings	19.50
Mixed Borings, Turnings	17.00
Short Shovel Turnings	23.00
Cast Iron Borings	19.00
Bar Crops and Plate	28.00-29.00
Cut Structurals	28.00-29.00

Cast Iron Grades

No. 1 Cupola Cast	35.00-36.00
Stove Plate	30.00-31.00
No. 1 Wheels	30.50-31.00

Railroad Scrap

No. 1 R.R. Heavy Melt.	27.00-28.00
R.R. Malleable	nominal
Rails, Rerolling	33.00-35.00
Rails, 3 ft and under	36.00
Angles and Splice Bars	35.00-36.00

ST. LOUIS

No. 1 Heavy Melt. Steel	*$32.00-33.00*
No. 2 Heavy Melt. Steel	28.00-29.00
Machine Shop Turnings	19.00-20.00
Short Shovel Turnings	*22.00-23.00*

Cast Iron Grades

No. 1 Cupola Cast	*39.00-41.00*
Charging Box Cast	33.00-34.00
Heavy Breakable Cast	32.00-33.00
Brake Shoes	34.00-35.00
Clean Auto Cast	39.00-41.00
Burnt Cast	33.00-34.00

Railroad Scrap

R.R. Malleable	36.00-37.00
Rails, Rerolling	48.00-50.00
Rails, Random Lengths	*38.00-39.00*
Rails, 3 ft and under	*41.00-42.00*
Uncut Tires	*34.00-36.00*
Angles, Splice Bars	*39.00-41.00*
Railroad Specialties	*39.00-40.00*

SAN FRANCISCO

No. 1 Heavy Melt. Steel	$20.00
No. 2 Heavy Melt. Steel	18.00
Nos. 1 & 2 Bundles	16.00
No. 3 Bundles	13.00
Machine Shop Turnings	9.00

Cast Iron Grades

No. 1 Cupola Cast	30.00-35.00

Railroad Scrap

No. 1 R.R. Heavy Melt.	20.00
Rails, Random Lengths	20.00

SEATTLE

No. 1 Heavy Melt. Steel	$18.00
No. 2 Heavy Melt. Steel	18.00
No. 1 Busheling	15.50
Nos. 1 & 2 Bundles	16.00
No. 3 Bundles	*12.00*
Machine Shop Turnings	13.00
Mixed Borings, Turnings	13.00
Punchings & Plate Scrap	*27.50-30.00*
Cut Structurals	*27.50-30.00*

Cast Iron Grades

No. 1 Cupola Cast	25.00-30.00
Heavy Breakable Cast	25.00
Stove Plate	25.00
Unstripped Motor Blocks	*23.00*
Malleable	25.00
Brake Shoes	*23.00*
Clean Auto Cast	*25.00-30.00*
No. 1 Wheels	*25.00-30.00*

Railroad Scrap

No. 1 R.R. Heavy Melt.	19.00
Railroad Malleable	25.00
Rails, Random Lengths	19.00
Angles and Splice Bars	19.00

LOS ANGELES

(F.o.b. car, Los Angeles)

No. 1 Heavy Melt. Steel	$20.00
No. 2 Heavy Melt. Steel	18.00
Nos. 1 & 2 Bundles	16.00
No. 3 Bundles	nom.
Machine Shop Turnings	5.00
Mixed Borings, Turnings	5.00
Punchings & Plate Scrap	26.00

Cast Iron Grades

No. 1 Cupola Cast	36.00-37.00

Railroad Scrap

No. 1 R.R. Heavy Melt.	20.00
Rails, Rerolling	30.00

HAMILTON, ONT.

(Delivered prices)

Heavy Melt.	$27.00
No. 1 Bundles	27.00
Mechanical Bundles	25.00
Mixed Steel Scrap	23.00
Mixed Borings, Turnings	20.00
Rails, Remelting	27.00
Rails, Rerolling	30.00
Busheling	21.50
Bushelings new factory, prep'd	25.00
Bushelings new factory, unprep'd	20.00
Short Steel Turnings	20.00

Cast Iron Grades

Cast	40.00-43.00*

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* F.o.b. shipping point.

Sheets Strip . . .

Sheet and Strip Prices, Pages 129 & 130

Philadelphia—Sheet supply is as tight as ever. Mills are behind on commitments and indications point to their having more demand in third quarter than they can handle. Gray market offerings are being made well above the going mill market and some business is being done.

At the same time, the Penn-Ohio Steel Co., Birdsboro, Pa., which earlier in the year resumed production of conversion ingots after a number of months of idleness, has again suspended. This is due to lack of specifications from a large automobile manufacturer said to be Chrysler. Ingots were shipped to an eastern mill for conversion into sheets, in turn being shipped to the Budd Co., for stamping under contract with the automobile manufacturer.

Slightly in excess of 25,000 tons of sheets and strip will be required for the 5000 gondolas and 5000 box cars placed by Equitable Life for leasing to the Pennsylvania.

Boston — Order carryovers into third quarter will be substantial in flat-rolled products. With curtailments due to vacations looming, pressure for tonnage is strong. Some buying is being done for inventory. Narrow cold-rolled strip schedules are full through third quarter; inventories of hot-rolled to meet this forward buying varies widely, ranging from nearby to 30 days' requirements.

New York—Sheet demand continues highly active. Producers are either sold well into third quarter on major grades and are allocating tonnage on a month-to-month basis, or are sold out entirely for that period. Picatinny Arsenal, Dover, N. J., will close bids June 2 on sheets for 1,010,000 fin assemblies for rockets.

Chicago—Some users say sheet steel is harder to get and requires longer delivery time than in any previous period. Third quarter books are filled. Many users would make fourth quarter commitments, if mills would accept. Conversion capacity is booked solidly until late fall and one mill can take no additional orders for hot or cold-rolled sheets this year.

Reduction of $4 a ton in the base price of tight cooperage hoop was put into effect May 22 by Acme Steel Co., this city. Revisions of extras, also effective today, conform with those announced by other producers.

Cleveland—Sheets are as scarce as hens' teeth in this area to hear steel salesmen tell it. And it is apparent they are not just talking. The mills are booked up through third quarter; in a few instances tonnage carries into fourth quarter. No letup in demand is sighted with pressure from consumers increasing all along the line. Conversion business is rising and gray market offerings are receiving more attention. In the main, however, consumers are staying out of the premium market.

Cincinnati—Sheet mills see no rift in the broad, heavy demand for tonnage. Where seasonal slackening might be expected, none appears. Pressure for flat-rolled steadily grows stronger.

Birmingham—Clamor for sheets is as insistent as ever. Tennessee Coal, Iron & Railroad Co. continues to

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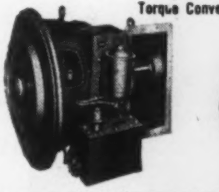
Moats ... mass-produced

Moats, in 1575, were "mass-produced" with "powered" machinery as shown in this engraving by the engineer Besson.

Today's mass production, however, calls for far more practical solutions to problems of power transmission than existed when Knighthood was in Flower. More and more, the answers to modern problems are being found in hydraulic power transmission devices, with whose development the name "Twin Disc" is synonymous.

For the last 31 years, Twin Disc has been providing these solutions, not only for construction equipment, but wherever power must be applied—in the lumber, petroleum, farm equipment, marine and machine tool fields. TWIN DISC CLUTCH COMPANY, Racine, Wisconsin (Hydraulic Division, Rockford, Illinois).

Hydraulic Torque Converter



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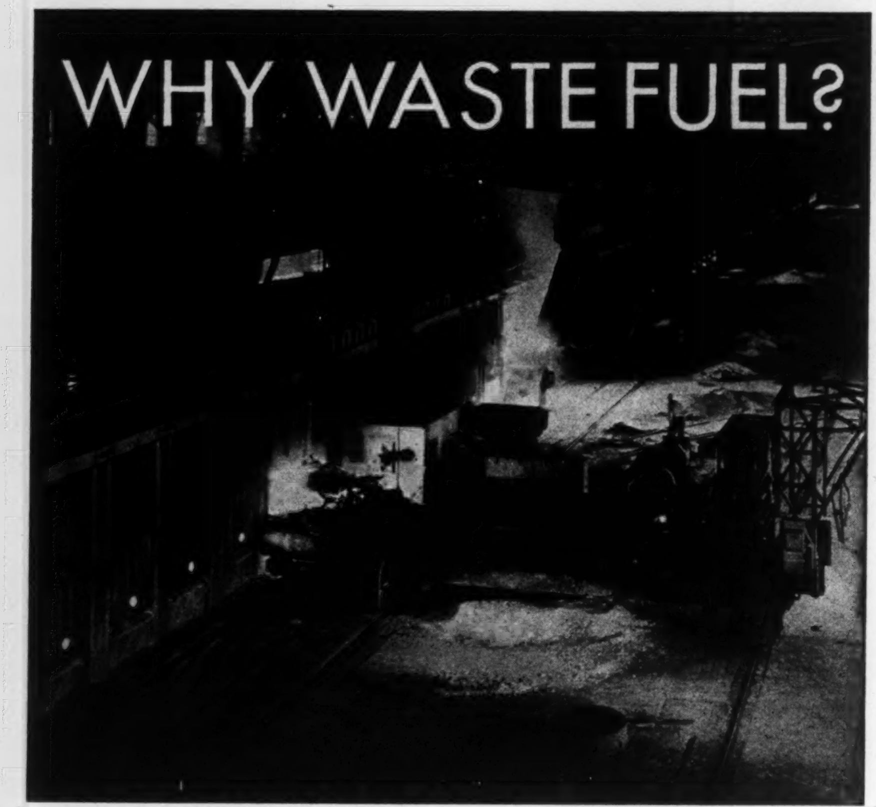

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BY REDUCING HEAT LOSSES...

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Therm-O-flake INSULATIONS are designed to reduce heat losses and seal furnace walls against cold air infiltration. These are used regularly on hundreds of open hearth furnaces and save steel producers thousands of fuel dollars daily.

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Exclusive Manufacturers of
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open hearth Insulation

break production records and has moved into relatively better supply position.

St. Louis—Demand for sheets from all sources is unremitting. Third-quarter books are filled or allotted. First quarter flat steel shipments were 2 per cent above the corresponding 1949 period. Gray market is being reactivated.

San Francisco—Furious scramble for sheets continues. Supplies are the tightest in years. Some easing in the tight supply of galvanized sheets is indicated within the next three months, although the situation may worsen before it gets better.

Los Angeles — Sheets are tighter. Fabricators report April deliveries now are being scheduled for May or June, producers quoting 12 to 16 weeks delivery. Geneva Steel Co. has resumed full operation.

Steel Bars . . .

Bar Prices, Page 129

Pittsburgh—Carnegie-Illinois Steel Corp. has reduced price base on tight cooperage hoop $4 per ton, effective May 16, and has raised extras about $9.25 per ton, resulting in an average increase of $5.25. Revisions in the extra card include deletion of width range over 15/16-in. to 1⅛-in. from the table on size extras and raising the extras for various thicknesses in width range of over 1⅛ to 2 in., inclusive, $4 to $5 per ton. The former length extras for cut lengths of 25 cents for one end rounded and 40 cents for both ends rounded have been broken up into length extras for specified length ranges from 24 to 240 in., inclusive, and for various ranges of thickness and widths for one end rounded, with a $3 per ton differential for both ends rounded.

Merchant carbon bar interests note no easing in pressure for deliveries. Rolling schedules are committed through July on mill allotment basis. Coldfinishers' production schedules are retarded below 90 per cent of capacity in many instances by inadequate inventories of hot-rolled material.

Cleveland—Unusually heavy demand for hot-rolled carbon bars is being encountered from all directions. Normally seasonal slackening in demand would be under way at this time but it hasn't yet appeared. Bookings of some sellers now extend into fourth quarter and they have been forced to decline business calling for July-August delivery. Lack of sufficient steel supply to keep bar mills fully engaged partly explains the growing shortage situation.

New York—Delivery schedules on bars are back to normal, following termination of the six-day rail strike which affected several major lines. Demand is still brisk. Most sellers have little to offer before late July or August on hot carbon.

Boston—Except for larger sizes, hot-rolled carbon bars are sold through third quarter and some tentative orders are booked for fourth. There are openings for cold-finished bars in some sizes, while alloy bar deliveries range from six to seven weeks. Demand for bars is well diversified.

Philadelphia—Most carbon bar producers have little to offer before August indicating steady expansion in backlogs. Demand from forgers has picked up. Railroad specifications are heavier. Cold drawers are specifying more freely.

San Francisco—Hot-rolled bars are in the "super plentiful" class. Demand hasn't shown much change, but heavy production earlier this year built up top-heavy supplies.

Reinforcing Bars . . .

Reinforcing Bar Prices, Page 129

Pittsburgh—Inquiries for reinforcing bars for private work are depressed in relation to new tonnage volume for municipal and federal projects. Highway construction requirements are active. Sellers are booked through July.

Seattle — Demand for reinforcing bars continues strong. Active construction in this area, involving projects calling for small tonnages each, has estimating staffs working overtime.

Plates . . .

Plate Prices, Page 129

New York—Decision of rail traffic executives to add structural plates to the list of steel items now taking rail freight reductions on minimum carload quantities of 80,000 pounds is expected early in June. If such action is taken, plates affected probably will be limited to 96 in. in width and 35 ft in length.

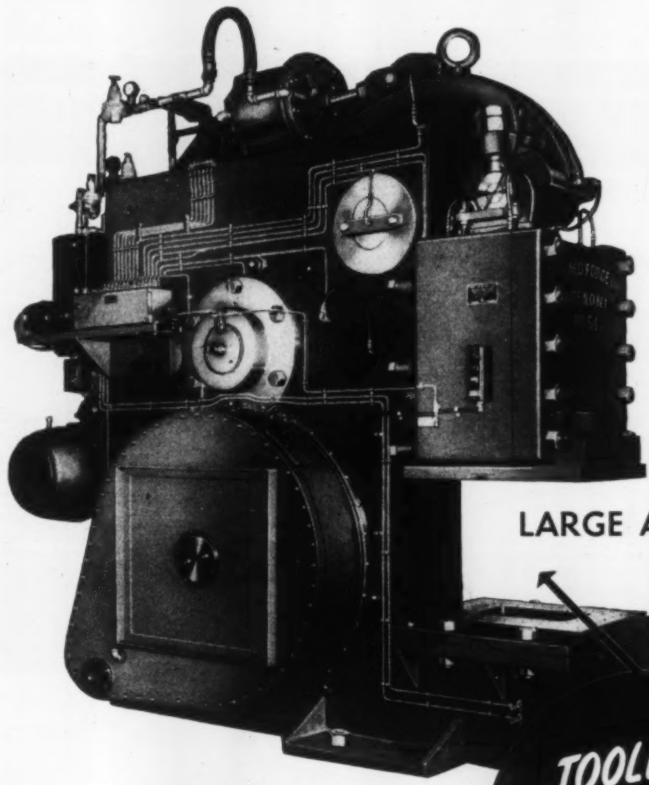
Pittsburgh — Unbalanced demand-supply relationship in plates will be accentuated through summer as a result of Pennsylvania Railroad's 10,000 freight car program and probability of similar programs likely to be initiated by other carriers. Sellers are committed through July under mill allotment distribution and there is no indication of an easing in demand for pipe lines and heavy industrial machinery, stand-by tank and barge construction.

Boston—Except for weldments and large diameter pipe, plate inquiry is for smaller sizes on which deliveries extend into August. Small tank inquiry is bolstered by installations for air field fueling systems. The government will furnish part of the materials for one at Limestone, Me.

Philadelphia—Despite absence of important ship work and lag in pressure vessel requirements, backlogs of district plate mills are expanding. Requirements for the 10,000 freight cars, placed by Equitable Life for leasing to the Pennsylvania amount to approximately 55,000 tons.

Cleveland—Fair volume of plate business is before the market but demand lags behind that for other products. Supplies, however, are noticeably tighter, in part due to diversion of much plate tonnage to production of large-diameter pipe. At the same time, sheet rolling facilities which at times are utilized to produce plates are being scheduled 100 per cent on sheets.

Chicago—There is no indication that plate demand will lessen. It has been somewhat slow in following the upward trend in steel demand generally but with deliveries falling behind promises, extensive carryovers to third quarter and substantial order-



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ing from eastern mills some consumers expect a critical shortage to develop in the next few months. Activity of freight car builders has increased materially and by July steel supply will be a major problem for some.

Birmingham—Plates still lag behind in supply. No emergency is evident, but it seems the district cannot produce sufficient tonnage to meet all demnads.

San Francisco—Demand for plates is increasing. Supplies are tightening with some pinch already reported on sizes made only by eastern mills. Little eastern material is reaching the West Coast.

Seattle—Plate farbicators have fair backlogs, mostly small jobs involving tanks and pipe. Largest contract pending totals 1000 tons for waste disposal tanks at Hanford works, bids in. Several jobs for water storage tanks are up for figures.

Tubular Goods . . .

Tubular Good Prices, Page 132

Boston — Inquiries for seamless steel pipe for natural gas distribution lines in New England are being made by gas companies. Prices also are being asked by others to be used in connection with cost estimates for extension of lateral and lead-in lines. June quotas for merchant pipe are sold, although some distributors failed to take all the tonnage allocated, the difference being taken up by direct shipments.

Wire . . .

Wire Prices, Page, 131

Cleveland—Wiremakers will enter third quarter with substantial order carryover from second quarter. Despite capacity operations they have been unable to catch up with demand which continues strong from all directions. Reports that a local bolt and nut manufacturer purchased four carloads of imported coiled rods recently lack confirmation. However, a representative of a New York steel importer has been actively soliciting business in this area for some time.

Boston—Demand for wire, including rope wire and some low-carbon grades and excepting some specialties, is lighter. Consumer inventories are in better balance on rods and finished wire, including cold heading stock. Schedules are well filled into the third quarter on most high-carbon grades. Offerings of imported nails are softening prices in some quarters.

Chicago—Spurt in woven wire fencing purchases is reported. Concrete reinforcing mesh orders are record-breaking so far this year for one major producer. Other standard wire items are moving in good volume. Manufacturers' wire is tight; nails, with few exceptions as to size, are in short supply. Bed spring makers' business is sustained at a high level and automotive requirements are tremendous.

Birmingham—Most wire items hold steady with demand good. The situation is somewhat easier than a few weeks ago, but there is still plenty of business on hand.

Structural Shapes . . .

Structural Shape Prices, Page 129

Boston — Contractors are buying fabricated and erected structural steel $4 a ton lower than estimates in contracts, due to competition among fabricating shops, although some of the latter are booked through September. Structural inquiry is sustained with public work, bolstered by slight improvement in private construction.

New York—New Jersey Turnpike Authority bridge work features structural activity. Private work is off a little, although a good volume is active. Fabricating shop backlogs, as well as shape mill delivery promises are more extended.

Pittsburgh — Moderate improvement in order backlogs for structural shapes is noted. Most shops are on full schedules. However, keen competition persists for new work, resulting in frequent price shading. Deliveries extend into July on standard shapes. Wide flange beams are in tightest supply with sellers committed through July.

Philadelphia—Fabricating shop deliveries are becoming more extended. Bridgework continues outstanding. Fifty thousand tons of shapes will be required for the 10,000 freight cars let by Equitable Life for leasing to the Pennsylvania.

Birmingham—A five weeks' strike of plumbers and steamfitters is reflected in shape demand which has slumped within the past few days. Some large construction projects have been held in abeyance.

San Francisco—With private building activity slowly picking up, and with public works demand remaining active, buying in structural shapes is considerably above last winter's level.

Seattle—Fabricators have 60 to 90 days' backlogs, but are seeking new work for August. Small contracts predominate, but the total volume is heavy. Sizable tonnages are pending.

Coal Chemicals . . .

Coal Chemical Prices, Page 132

Pittsburgh—U. S. Steel Corp. subsidiaries, effective May 8, reduced ammonia sulphate prices to a range of $32 to $33 per net ton at northern production points, and to $37 at Fairfield. Geneva and Ironton prices are unchanged at $45. Due to unsettled export market conditions, notably in Puerto Rico, export prices have been reduced from $45 to $35 per net ton, retroactive to Apr. 1, at all seaboard points.

Synthetic nitrogen plants erected during the war have been converted to manufacture of nitrogen chemicals for fertilizers, resulting in increased capacity for ammonia sulphate of 160 per cent since the war, most of it during the last year.

Soda Ash Prices Rise July 1

New York—Solvay Sales Division, Allied Chemical & Dye Corp., this city, will advance soda ash 10 cents per 100 lb, f.o.b. works, and chlorine, and caustic soda in all forms, 15 cents, effective July 1. New sched-

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*Registered Trade Mark
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DIE SINKING MILLING CUTTERS

ule on soda ash is: 58 per cent light, bulk, carlots, $1.10 per 100 lb; in paper bags, carlots, $1.35; barrels, carlots, $1.85; 58 per cent dense, bulk, carlots, $1.20; paper bags, carlots, $1.45; barrels, carlots, $1.95.

Caustic soda schedules include a price of $3.20 on 76 per cent solid, in drums, carlots; liquid chlorine, schedules, a price of $2.25 per 100 lb, single unit tank cars.

Iron Ore . . .

Iron Ore Prices, Page 133

Cleveland — Downbound movement of iron ore on the Great Lakes is accelerating after one of the latest season starts in years because of bad ice conditions on the upper lakes. The belated shipping start probably means a late season closing. In any case, lake carriers will be hard pressed throughout the season to bring down sufficient ore for current expanded consumption and next spring's stockpile. Ore shipments were only slightly affected by the shortlived railroad strike. Diversion of some cargoes from originally scheduled docks and ports was necessary. The movement of coal was much more seriously affected.

Pig Iron . . .

Pig Iron Prices, Page 128

Cleveland—Iron sellers, entertaining a rising volume of demand from the foundries, are shipping every pound of metal produced for the merchant trade. There is no surplus. As a result, speculation has developed as to the chances for a shortage of iron developing over coming months. Sellers, however, say supplies will be adequate unless conditions get entirely out of hand. Last week the Interstate Commerce Commission denied an application for lower rail freight rates on pig iron from Cleveland and Lorain, O., to Worcester, Mass. The railroads had applied for a reduction of $2.76 per ton to permit competition with water-rail shipments. The ICC maintained the proposed cut was too drastic and, if granted, would give Cleveland-Lorain a freight advantage of 88 cents per ton over the Buffalo, N. Y., shipper.

Pittsburgh — Shutdown of Pittsburgh Coke & Chemical Co.'s merchant foundry iron stack May 10 for at least six weeks is expected to create a shortage of pig iron since most foundries do not have over 30 days' supply. Some iron is available from the Birmingham district, but at abnormally high price levels due to freight involved. Similarly, iron is available from Germany at $43, eastern seaboard.

Most jobbing foundries continue to operate only three days per week.

New York—District foundry melt lags a bit behind the April rate. However, pig iron deliveries are being well sustained, partly by current high price of scrap.

Philadelphia — Although jobbing foundries are not too active, larger pipe foundries and producers of sanitary castings are operating at high level with backlogs which should keep them busy well into third quarter. This situation, combined with active steelmaking operations and mounting prices for steel scrap, has increased pressure on domestic pig iron producers. Imports are not heavy, but nevertheless have filled in a certain gap. Prime grades of foundry and basic from abroad can be had at $38, duty paid, cars, Philadelphia.

Buffalo—Deliveries of merchant iron are at the best level of the year. Motor, building and farm equipment industries are active buyers. Producers report demand is easily absorbing output. All 16 stacks in this district are engaged.

Cincinnati—Demand for pig iron is picking up gradually. The undertone in the market is more optimistic than in many months.

Birmingham—Pig iron output is at capacity. Merchant iron sellers, however, say they will be hard pressed to meet demand for another several weeks.

St. Louis—Pig iron demand continues to increase. Producers manage to keep deliveries current on reduced quotas, but haven't been able to close the gap caused by the coal strike. Main pressure is from foundries whose inventories of iron are dwindling under a rush of new orders.

Scrap . . .

Scrap Prices, Page 136

Pittsburgh—Upward trend in scrap continues unabated with sales of No. 1 heavy melting recorded at $37-$38, up $2 on the higher side of the range. No. 1 bundles advanced $3 a ton to $39. Machine shop and mixed turnings were purchased by crushers at $28, up $2. Brokers are paying up to $39.50 for No. 1 heavy melting which indicates this grade may reach $40 soon. Conversion deals are a major factor in this connection. Most mills insist last purchase did not exceed $36 for No. 1 heavy melting. It is acknowledged large tonnage commitments could no longer be made at that level. Cast grades have not registered similar price buoyancy.

Philadelphia—Steel scrap demand continues heavy. Open-hearth grades are nominally 50 cents a ton higher, based on brokers' and dealers' prices. Consumer buying is limited by fact sellers generally are holding off until they can better gage conditions.

The first of several cargoes of foreign heavy melting steel scrap for a leading eastern consumer is expected to arrive within the next week or so. Prices are $2 a ton higher on low phos; $1.50 on knuckles and couplers and steel car wheels; 50 cents on electric furnace bundles and heavy turnings. Cast iron grades are unchanged except for an increase of $1 on No. 1 wheels. Importation of foreign pig iron at prices well below the domestic market is tending to check any advance in some of the major cast grades.

New York—Scrap brokers have advanced buying prices on leading steel grades under pressure of meeting expanding consumer demand. Machine shop turnings and mixed borings and turnings are unchanged, although market undertone is strong. Stability also characterizes the cast iron grades.

Boston—Resumption of price advance on No. 1 heavy melting steel

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United States Steel Export Company, New York

USS

MULTIGRIP FLOOR PLATE

UNITED STATES STEEL

to $26-$27, f.o.b. shipping point, is not being followed in full by No. 2, although bundles and No. 1 heavy busheling are higher. Lighter grades of steel scrap, borings and turnings, also are lagging behind the top grade of heavy melting.

Buffalo—Local scrap market has made a feeble attempt to close the gap between prices here and in markets elsewhere. Small sale of No. 1 heavy melting is noted at $31.50 to $32 a ton, still far below prices in nearby markets. Other steelmaking grades followed the rise in No. 1 material. An influx of scrap from the upper lakes and the eastern coast via the canal is expected. It is estimated more than 200,000 tons will arrive by water this season.

Cleveland—Steel scrap prices have advanced $2.50 a ton here on the basis of broker buying to cover old commitments and scattered sales to mills in the Valley. Undertone of the market remained strong at the close of the week with some interests expecting still higher prices in the immediate future. Local mills have placed no new orders.

Detroit—Tone of the scrap market continues strong but a trifle quieter on the eve of new automotive lists which will be released this week. Talk of steel mills reverting to the practice of earmarking persists and it will be resisted strenuously by automobile plants, many of which are well stocked with finished steel and are in a position to combat any dictation from steel suppliers on what they must do with production scrap.

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For Ferrous and Non-Ferrous Smelters and Foundries

Ruggedly constructed for low-cost service, this machine is completely self-contained. If necessary it can be moved by crane and erected wherever needed. Once it is set in place, only an electrical connection is necessary for operation. The complete unit consists of the machine proper, motor, gear unit, variable speed reducer and drive.

CAPACITIES: 3 tons per hour to 50 tons per hour. 15 ft. to 100 ft. in multiples of 5 ft.

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for Longer Service—Greater Economy

Bailey Stationary Wheel design eliminates 80% of the moving parts of the conventional type. The moulds are supported by endless chains that run on top of idler wheels which are mounted at stationary positions along the strand.

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ENGINEERS

LEADERSHIP THROUGH QUALITY

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Chicago—Purchases of scrap by mills was expected momentarily late last week. An unconfirmed report was that one mill had bought No. 1 heavy melting steel and No. 1 bundles at from $34 to $35. Brokers are paying as high as $34 for these grades to cover old orders. Cast is firm at quoted prices, although some scattered foundries are paying more than $42-$43 for No. 1 cupola.

Birmingham—Scrap is active but seems to be settling down to a routine. Movement to local yards is brisk and the upward price trend is believed momentarily halted.

St. Louis—Scrap market is humming under rising demand and tighter supplies. No. 1 heavy melting steel and short shoveling turnings are $1 higher. The latter normally is a low-volume, price-static item here. Both were prodded by outside demand. Most railroad scrap is also $1 higher.

A scrap buying experiment is being tried by Granite City Steel Co. The company formerly bought through 20 to 30 brokers; now it has arranged temporarily to buy through only one, who will get his supplies from other brokers.

San Francisco—Steelmaking grades are moving in larger quantities, but prices are unchanged. Big mills are buying more heavily at current levels, but any firming tendency in prices is met by a drying up of demand. Heavy buying of No. 1 cupola cast iron is tightening supplies of that grade.

Seattle—Scrap market has developed a strong undertone. Dealers are expecting higher levels, but the larger buyers state current prices are bringing in ample tonnages. Foundry operations show seasonal activity.

Warehouse . . .

Warehouse Prices, Page 133

Philadelphia — Reflecting higher zinc prices, distributors have advanced galvanized sheets $1 a ton. All other prices are steady. Business is still active, although trading so far this month has been below the April rate. Inventories at most warehouses are in fair balance, except in sheets. Distributors could sell much more of this latter product were an adequate supply available.

Boston—Distributors are short of sheets, notably light gage cold-rolled. Inventories in other products are in fair balance. Demand for steel from warehouses is active and heaviest for sheets. Galvanized product prices are higher, reflecting advances in zinc price.

Cleveland—Steel distributors are feeling the growing pinch in sheet and strip supplies and are hard put to keep even minimum stocks on hand. Just as quickly as a mill shipment is received it is moved to consumers whose requirements, if anything, are rising. Hot-rolled bar supplies also are tighter. Warehouse order volume is holding up well this month.

Cincinnati — Sales of warehouse

steel are in good volume. The pinch in sheets is getting worse, and the list of short supplies now includes plates, structurals, and hot-rolled bars.

San Francisco — Warehouse steel sales are holding at the March-April level, which in turn was well above the low point of activity early this year. Shortages of sheets and several other items, particularly materials rolled by eastern mills, has put a brake on turnover. Prices are firmer.

Fasteners . . .

Bolt, Nut, Rivet Prices, Page 132

Cleveland—Consuming demand for bolts, nuts, rivets and other industrial fasteners is exceeding expectations in some directions though experience among sellers is not uniform. Automotive, farm implement and general equipment manufacturers continue to specify actively. Railroad car business for rivet makers is improved over that of a few months back and the outlook for additional business from that direction is encouraging. Makers are having difficulty maintaining adequate steel stocks to support their operations, however. Bar stock is almost impossible to obtain from mills before late summer.

Rails, Cars . . .

Track Material Prices, Page 131

Chicago—Some rail mills fear when current tracklaying season ends they will be without orders. Substantial quantity of rails and accessories are needed, but appropriations of many roads have been insufficient to permit more than minimum purchases.

Philadelphia — Approximately 245,000 tons of steel, including 48,000 tons of wheels and axles and 39,000 tons of steel castings, will be required for the 10,000 freight cars which Equitable Life Assurance Society has ordered for rental to the Pennsylvania railroad. Costing in excess of $53,000,000, the equipment is said to represent the largest car order, in point of dollars, ever recorded.

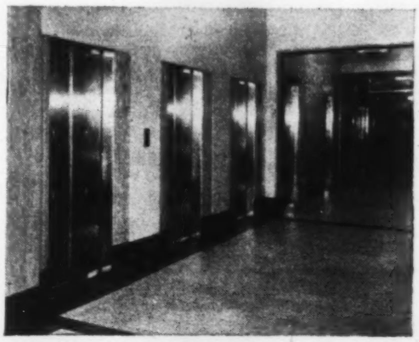
Canada . . .

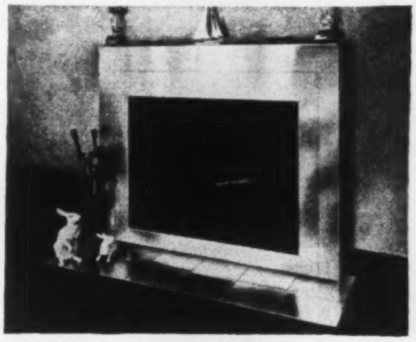
Toronto, Ont.—Canadian production of finished steel in February amounted to 320,213 net tons compared with 320,129 tons in January and 300,916 tons in February, 1949. Primary steel shapes shipped for sale in February amounted to 198,347 tons compared with 211,431 tons in January.

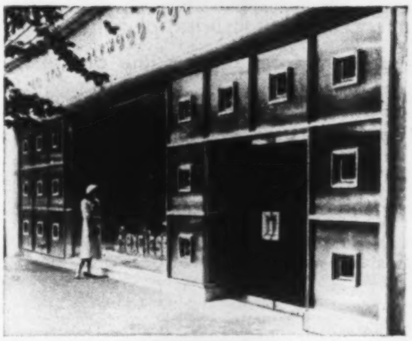
Of shipments in February, 39,316 tons went direct to railways and railway car shops; 18,151 tons to pressing, forming and stamping plants; 27,345 tons to merchant trade products; 23,669 tons to building construction; 17,714 tons to the container industry; 11,351 tons to agricultural equipment; 12,195 tons to the automotive industry; 8504 tons to machinery plants; 2424 tons to shipbuilding; 8759 tons to mining, lumbering, etc.; 922 tons to miscellaneous industries, wholesalers and warehousing accounted for 18,557 tons and exports for 7845 tons.

STAINLESS STEEL . . .

its many applications in the field of ARCHITECTURE







Stainless steel has inspired resourceful architects with so many uses for this most practical and decorative metal that it has certainly come into its own!

Because it will not rust, corrode or discolor, stainless steel is eminently practical: it is sturdy, long lasting and variously adaptable.

Because of its silvery sheen it lends the luxurious, decorative touch of beauty to interiors and exteriors.

Especially adaptable to the ideas of architects is *MicroRold* Stainless Steel. It is now being rolled in sheets up to 36″ wide as light as .010″ in thickness, and sheets 30″ wide as light as .005″ with *amazing uniformity of gauge.*

WASHINGTON STEEL CORP.
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WASHINGTON, PA.

STRUCTURAL SHAPES . . .

STRUCTURAL STEEL PLACED

20,300 tons, New Jersey turnpike bridge over the Passaic river, Cont. No. 20, to Bethlehem Steel Co.

15,500 tons, New Jersey turnpike bridge over the Hackensack river, cont. No. 17, to American Bridge Co., Pittsburgh.

7000 tons, state bridge work, Corning, N. Y., through Lane Construction Co., Meriden, Conn., to American Bridge Co., Pittsburgh.

2325 tons, New Jersey turnpike bridge work, cont. No. 23, section 4, through Brookfield Construction Co., New York, to Harris Structural Steel Co., that city.

1315 tons, New Jersey turnpike bridge, Rancocas creek, cont. No. 28, through Union Building & Construction Corp., Passaic, N. J., to Harris Structural Steel Co., New York.

500 tons, Du Pont plant, Bloomington, Tex., to Consolidated Western Steel Corp., Los Angeles.

355 tons, state bridges, Plymouth, Mass., to Groisser & Shlager Iron Works, Somerville, Mass.; M. DeMatteo Construction Co., Quincy, Mass., general contractor.

325 tons, building, Salvation Army, Boston, to Groisser & Shlager Iron Works, Somerville, Mass.; McCutcheon Co., Boston, general contractor.

300 tons or more, five highway bridges in Alaska, Matanuska river; erection award to Munter Construction Co., Seattle, $297,900; materials furnished by government.

300 tons, miscellaneous contracts for schools and industrial plants in local area, to Pacific Car & Foundry Co., Seattle.

120 tons, twin span deck plate girder bridge, Gorham, N. H., to American Bridge Co., Pittsburgh; P. E. Susi, Pittsfield, Me., general contractor.

100 tons, warehouse, Parkway Investment Inc., Cambridge, Mass., to A. O. Wilson Structural Co., Cambridge.

STRUCTURAL STEEL PENDING

3350 tons, New Jersey turnpike bridge work, cont. No. 34, Raritan and Woodbridge townships, Middlesex county; bids June 6; also 30,000 ft of steel or concrete bearing piles.

1600 tons, New Jersey turnpike bridge work, cont. No. 29, Mercer and Middlesex counties; bids June 1; also 32,700 ft of bearing piles and 2950 ft of railing.

1482 tons, New Jersey turnpike work, cont No. 36, Burlington and Mercer counties; bids June 8; also 20,550 ft of guard rail.

1200 tons, rapid transit station, Metropolitan Transit Authority, East Boston, Mass.; bids in.

1100 tons, generator station, Potomac Electric Power Co., Washington; Stone & Webster Engineering Corp., Boston, general contractor.

830 tons, apartment, Palmer road and Kimball avenue, Yonkers, N. Y.; bids asked.

550 tons, Columbia Memorial Hospital, Hudson, N. Y.; bids closed May 18.

450 tons, state bridge, Bucks county, Pennsylvania; Kellor Construction Co., Perkiomenville, Pa., low on general contract.

400 tons, cont. 7, Delaware Memorial bridge, Wilmington, Del.; bids June 15.

300 tons, Farnhurst interchange bridge, New Castle county, Delaware; bids May 24.

275 tons, 125-ton traveling and 70-ton gantry cranes, for Canyon Ferry power project, Idaho; bids to Bureau of Reclamation to be invited late May.

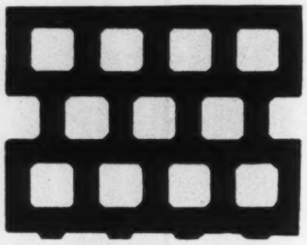
200 tons, reconstruction, Pennsylvania railroad bridge, Cadiz, O.; bids closed May 18.

200 tons, Pennsylvania Railroad overpass, Wilmington, Del.; bids May 23.

130 tons, steel plate girder bridge, North Adams, Mass.; bids May 31, Boston.

120 tons, truss bridge, Great Barrington, Mass.; bids May 31, Boston.

120 tons, 189-ft two span deck plate girder bridge, Gorham, N. H.; P. E. Susi, Pittsfield, Me., low, general contractor.



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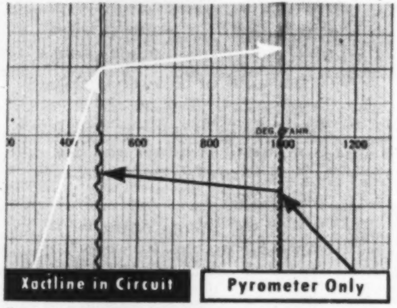
Overshooting

Undershooting

Are you going to continue to put up with that troublesome overshooting and undershooting inherent in your conventional pyrometer control—especially when it is so easy to eliminate that saw-tooth effect?

Put XACTLINE in the control circuit. XACTLINE anticipates the temperature changes—before they occur. And too, it nullifies the varying amounts of thermal lag, residual heat, and mechanical lag—producing a short on-off cycle resulting in "Straight-Line" temperature control. This performance is possible because there is no dependence upon mechanical parts—XACTLINE operates electrically.



Exact reproduction of temperature chart for a heating process showing the comparison of the "Straight-Line" temperature control produced by XACTLINE and the saw-tooth curve obtained with only conventional control.

XACTLINE is applicable to any indicating or recording pyrometer control of the millivoltmeter or potentiometer type. It should be used wherever close temperature control is required — any type of electrically heated oven, furnace, kiln, injection molding machine, and fuel-fired furnaces equipped with motor-operated or solenoid valves.

XACTLINE is a complete unit. No adjustment or coordination with the control instrument is required regardless of the size of the furnace, length of the heating cycle, or size of the load. Installation is very simple — can be either flush or surface mounted.

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Unstated, steel superstructure Quincy pumping plant, Columbia Basin project; bid call by Bureau of Reclamation late May.

Unstated, 125-ton gantry crane for Hungry Horse dam, Montana; bids to Bureau of Reclamation, Denver, June 6.

Unstated, five radial gates for Columbia Basin project; bids to Bureau of Reclamation, Denver, June 6.

Unstated, ring gate for Hungry Horse, Montana, spillway; bids to Bureau of Reclamation, Denver, June 8.

Unstated, facilities warehouse for A. E. C. at Idaho Falls, Idaho; general contract to Utah Construction Co., Salt Lake City, Utah, low $215,063.

Unstated, tunnel, intake and improvements, Mud Mountain dam; bids to U. S. Engineer, Seattle, June 9.

REINFORCING BARS . . .

REINFORCING BARS PLACED

193 tons, Renton, Wash., high school addition, to Bethlehem Pacific Coast Steel Corp., Seattle.

150 tons, Murphy Dome, Alaska Military installation, local school and bridge projects, to Bethlehem Pacific Coast Steel Corp., Seattle.

116 tons, University of Idaho music building, Moscow, to unstated fabricator; C. B. Lauch, Boise, general contractor.

100 tons, Washington state highway bridge, Thurston county, to Bethlehem Pacific Coast Steel Corp., Seattle; Everett Pile Driving Co., Everett, general contractor.

100 tons or more, Rice Heights housing project, Hartford, Conn., to Scherer Steel Co., Hartford, Conn.; Anderson Fairoaks Construction Co., general contractor.

REINFORCING BARS PENDING

1350 tons, New Jersey turnpike bridge work, cont. No. 34, Middlesex county; bids June 6.

589 tons, New Jersey turnpike bridge work, cont. No. 36, Burlington and Mercer counties; bids June 8.

535 tons, New Jersey turnpike bridge work, cont. No. 29, Mercer and Middlesex counties; bids June 1.

200 tons, extension Potholes, East canal, Columbia Basin project; bid call by Bureau of Reclamation, late May.

180 tons, also 75 tons shapes, canal headworks, etc., Columbia Basin project; bid call by Bureau of Reclamation late May.

Unstated, three buildings for reactor testing station, Idaho Falls, Ida.; bids to A. E. C., May 25.

Unstated, Oregon state highway bridges Marion, Yamhill and Baker counties; bids to commission, Portland, Oreg., May 25-26 respectively.

Unstated, two 14-story apartment buildings, Anchorage, Alaska, $3 million involved; general contracts awarded.

PLATES . . .

PLATES PLACED

100 tons, elevated storage tank, Menlo Park, Portland, Oreg., to Pittsburgh-Des Moines Steel Co., Pittsburgh.

PLATES PENDING

1000 tons, waste disposal tanks, Hanford project; Fred J. Early Jr. Co., San Francisco, apparently low, $1,567,126 to General Electric Co. prime contractor for A. E. C.

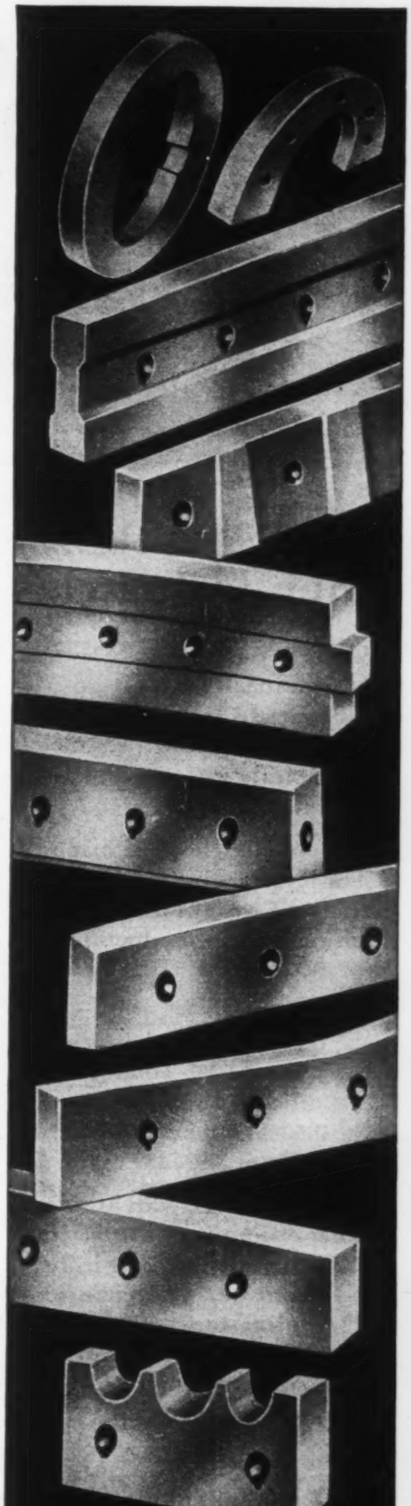
Unstated, storage tank, Winchester, Wash.; Pittsburgh-Des Moines Steel Co., Pittsburgh, bid of $15,828 recommended.

Unstated, 150,000-gal. storage tank for Hungry Horse dam project; bids to Bureau of Reclamation, Denver, June 8.

RAILS, CARS . . .

LOCOMOTIVES PLACED

Bessemer & Lake Erie, five 1500-hp diesel-electric road switching units, to Baldwin Locomotive Works, Eddystone, Pa.



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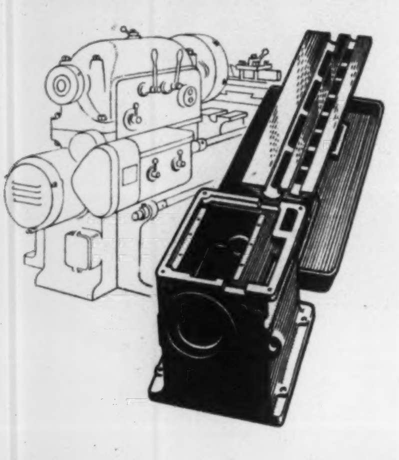

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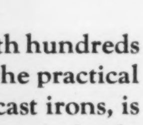

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Central of Georgia, seven diesel-electric locomotive units, two 2000-hp passenger and two 1500-hp switching units, to Electro Motive Division, General Motors Corp., LaGrange, Ill., and three 1500-hp switching units to American Locomotive-General Electric Companies, Schenectady, N. Y.

Chesapeake & Ohio, sixteen 1500-hp road switching and five 1200-hp switching diesel-electric locomotive units to General Motors Diesels Ltd., London, Ont.

Maine Central, 13 diesel-electric locomotive units, eight 1500-hp road switchers and three 1200-hp switchers, going to Electro-Motive Division, General Motors Corp., LaGrange, Ill., and two 1000-hp switchers to the American Locomotive-General Electric Companies, Schenectady, N. Y.

RAILROAD CARS PLACED

Pennsylvania, 10,000 freight cars, through Equitable Life Assurance Society, distributed as follows: 3000 gondolas to Pullman-Standard Car Mfg. Co., Chicago; 2000 gondolas to Bethlehem Steel Co., Bethlehem, Pa.; 2000 box cars to Pressed Steel Car Co., Pittsburgh; 1500 box cars to American Car & Foundry Co., New York; 1000 box cars to General American Transportation Corp., Chicago; 500 box cars to Greenville Steel Car Co., Greenville, Pa. Gondolas are to be 70 tons; box cars, 50 tons. Length of gondolas to be built by Pullman will be 52 ft 6 in.; by Bethlehem, 46 ft; all box cars will be 40 ft 6 in. Pressed Steel's cars will be built at Mt. Vernon, Ill.; American Car & Foundry's, at Berwick, Pa.; Bethlehem's, at Johnstown, Pa.; Pullman Standard's, at Butler, Pa.; General American's, at East Chicago, Ind.

Bangor & Aroostook, 300 combination paper and insulated heater cars, to Magor Car Corp., Passaic, N. J.

Chicago, Rock Island & Pacific, 100 all-steel covered hopper cars, to American Car & Foundry Co., New York.

250 fifty-ton box cars, Colorado Southern to own shops.

250 fifty-ton box cars, Ft. Worth & Denver City, to own shops.

RAILROAD CARS PENDING

1000 fifty-ton hopper cars and 500 fifty-ton box cars for Reading.

Chicago & Eastern Illinois, 200 box cars; pending. Directors have authorized funds.

Kansas City Southern, 300 fifty-ton box cars and 100 fifty-ton automobile cars; bids asked.

Missouri-Kansas-Texas, 50 to 100 seventy-ton hopper cars; bids asked.

FERROALLOYS

(*Continued from Page* 133)

Foundry Ferrochrome: (Cr 62-66%, C 5-7%). Contract, c.l., 8MxD, bulk, 22.0c per lb of contained Cr, c.l., packed 22.9c, ton 24.25c, less ton 26.0c. Delivered. Spot, add 0.25c.

Low-Carbon Ferrochrome: (Cr 67-72%). Contract, carload, lump, bulk, max. 0.03% C 31.85c per lb of contained Cr, 0.04% C 29.75c, 0.06% C 28.75c, 0.10% C 28.25c-28.5c, 0.15% C 28.0c, 0.20% C 27.75c, 0.50% C 27.5c, 1% C 27.25c, 1.50% C 27.1c, 2% C 27.0c. Carload packed add 1.1c, ton lot add 2.2c, less ton add 3.9c. Delivered. Spot, add 0.25c.

"SM" Low-Carbon Ferrochrome: (Cr 62-66%, Si 4-6%, Mn 4-6%, C 0.75-1.25% max.). Contract, carload, lump, bulk 27.75c per lb of contained chromium, carload, packed 28.85c, ton lots 30.05c, less ton 31.85c. Delivered. Spot, add 0.25c.

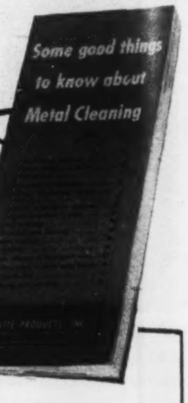
Low-Carbon Ferrochrome, Nitrogen Bearing: Add 5c to 0.10% C low-carbon ferrochrome prices for approx. 0.75% N. Add 5c for each 0.25% of N above 0.75%.

Low-Carbon Ferrochrome Silicon: (Cr 34-41%, Si 42-49%, C 0.05% max.) Contract, carload, lump, 4" x down and 2" x down, bulk, 20.50c per lb of contained chromium plus 11.30c per pound of contained silicon; 1" x down, bulk 20.65c per pound of contained chromium plus 11.50c per pound of contained silicon. F.o.b. plant; freight allowed to destination.

Chromium Metal: (Min. 97% Cr and 1% Fe). Contract, carload, 1" x D; packed, max 0.50%

WHAT'S THE FASTEST WAY TO CLEAN METAL?
See page 11

WHAT'S THE MOST ECONOMICAL WAY?
See page 9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¶ What are the advantages of reverse current for electrocleaning steel? See page 15.

¶ Can you electroclean brass without tarnishing? See page 18.

¶ Can you clean steel and condition it for painting for less than 20 cents per 1,000 square feet? See page 26.

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¶ Does your burnishing produce a luster you are proud of? See page 32.

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C grade, $1.03 per lb of contained chromium, ton lot $1.05, less ton $1.07. Delivered. Spot, add 5c.

Silicon Alloys

25-30% Ferrosilicon: Contract, carload, lump, bulk, 17.00c per lb of contained Si; packed 18.40c; ton lot 19.50c, f.o.b. Niagara Falls, N. Y., freight not exceeding St. Louis rate allowed.

50% Ferrosilicon: Contract, carload, lump, bulk, 11.3c per lb of contained Si, carload packed 12.9c, ton lot 14.35c, less ton 16c. Delivered. Spot, add 0.45c.

Low-Aluminum 50% Ferrosilicon: (Al 0.40% max.) Add 1.3c to 50% ferrosilicon prices.

75% Ferrosilicon: Contract, carload, lump, bulk, 13.5c per lb of contained Si, carload packed 14.8c, ton lot 15.95c, less ton 17.2c. Delivered. Spot, add 0.8c.

80-90% Ferrosilicon: Contract, carload, lump, bulk, 14.65-15.0c per lb of contained Si, carload packed 15.9c, ton lot 16.9c, less ton 18.05c. Delivered. Spot, add 0.25c.

Low-Aluminum 85% Ferrosilicon: (Al 0.50% max.). Add 0.7c to 85% ferrosilicon prices.

90-95% Ferrosilicon: Contract, carload, lump, bulk, 16.5c per lb of contained Si, carload packed 17.7c, ton lot 18.65c, less ton 19.7c. Delivered. Spot, add 0.25c.

Low-Aluminum 90-95% Ferrosilicon: (Al 0.50% max.). Add 0.7c to above 90-95% ferrosilicon prices.

Silicon Metal: (Min. 97% Si and 1% max. Fe). C.l. lump, bulk, regular 19.0c per lb of Si, c.l. packed 20.2c, ton lot 21.1c, less ton 22.1c. Add 1.5c for max. 0.10% calcium grade. Deduct 0.4c for max. 2% Fe grade analyzing min. 96% Si. Spot, add 0.25c.

Alsifer: (Approx. 20% Al, 40% Si, 40% Fe). Contract, basis f.o.b. Niagara Falls, N. Y., lump, carload, bulk, 7.65c per lb of alloy, ton lots packed 9.05c, 200 to 1999 lb 9.40c, smaller lots 9.90c. Delivered. Spot up 0.5c.

Briquetted Alloys

Chromium Briquets: (Weighing approx. 3⅜ lb each and containing exactly 2 lb of Cr). Contract, carload, bulk, 13.75c per lb of briquet, carload packed 14.45c, ton lot 15.25c, less ton 16.15c. Delivered. Add 0.25c for notching. Spot, add 0.25c.

Ferromanganese Briquets: (Weighing approx. 3 lb and containing exactly 2 lb of Mn). Contract, carload, bulk 10.45c per lb of briquet, c.l. packaged 11.25c, ton lot 12.05c, less ton 12.45c. Delivered. Add 0.25c for notching. Spot, add 0.25c.

Silicomanganese Briquets: (Weighing approx. 3½ lb and containing exactly 2 lb of Mn and approx. ½ lb of Si). Contract, c.l. bulk 10.30c, per lb of briquet, c.l. packaged 11.1c, ton lot 11.9c, less ton 12.8c. Delivered. Add 0.25c for notching. Spot, add 0.25c.

Silicon Briquets: (Large size—weighing approx. 5 lb and containing exactly 2 lb of Si). Contract, carload, bulk 6.15c per lb of briquet, c.l. packed 6.95c, ton lot 7.75c, less ton 8.65c. Delivered. Spot, add 0.25c.
(Small size—weighing approx. 2½ lb and containing exactly 1 lb of Si). Carload, bulk 6.30c, c.l. packed 7.10c, ton lots 7.90c, less ton 8.80c. Delivered. Add 0.25c for notching, small size only. Spot, add 0.25c.

Molybdic-Oxide Briquets: (Containing 2½ lb of Mo each) 95.00c per pound of Mo contained. F.o.b. Langeloth, Pa.

Calcium Alloys

Calcium-Manganese-Silicon: (Ca 16-20%, Mn 14-18% and Si 53-59%.) Contract, carload, lump, bulk 19.25c per lb of alloy, carload packed 20.05c, ton lot 21.55c, less ton 22.55c. Delivered. Spot add 0.25c.

Calcium-Silicon: (Ca 30-33%, Si 60-65%, Fe 1.50-3%). Contract, carload, lump, bulk 17.9c per lb of alloy, carload packed 19.1c, ton lot 21.0c, less ton 22.5c. Delivered. Spot add 0.25c.

Titanium Alloys

Ferrotitanium, Low-Carbon: (Ti 20-25%, Al 3.5% max., Si 4% max., C 0.10% max.) Contract, ton lots 2" x D, $1.40 per lb of contained Ti; less ton $1.45. (Ti 38-43%, Al 8% max., Si 4% max., C 0.10% max.) Ton lot $1.28, less ton $1.35, f.o.b. Niagara Falls, N. Y., freight allowed to St. Louis. Spot, add 5c.

Ferrotitanium, High-Carbon: (Ti 15-18%, C 6-8%). Contract $160 per net ton, f.o.b. Niagara Falls, N. Y., freight allowed to destinations east of Mississippi river and north of Baltimore and St. Louis.

Ferrotitanium, Medium-Carbon: (Ti 17-21%, C 3-4.5%.) Contract, $175 per ton, f.o.b. Niagara Falls, N. Y., freight not exceeding St. Louis rate allowed.

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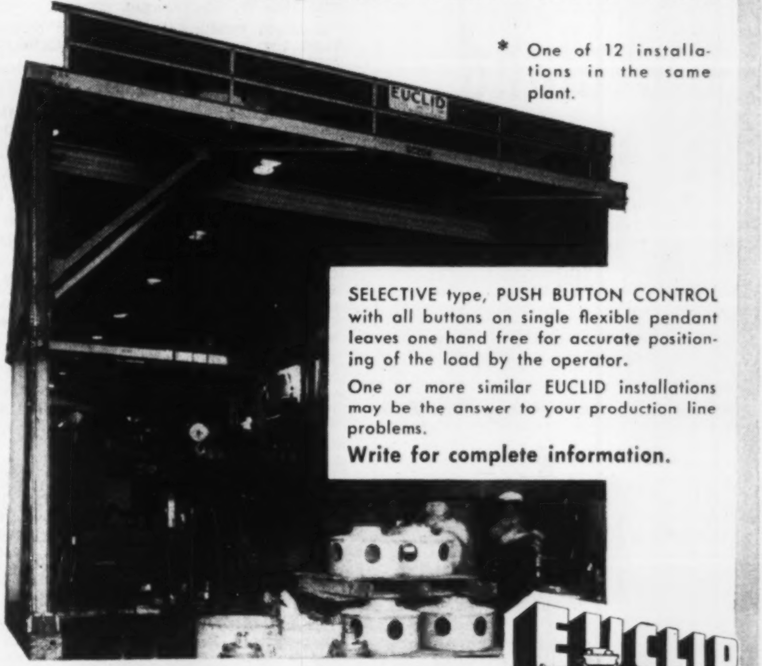

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Vanadium Alloys

Ferrovanadium: Open-hearth Grade (Va 35-55%, Si 8-12% max., C 3-3.5% max.) Contract, any quantity, $2.90 per lb of contained Va. Delivered. Spot, add 10c, **Crucible-Special Grades** (Va 35-55%, Si 2-3.5% max., C 0.5-1% max.), $3. **Primos and High Speed Grades** (Va 35-55%, Si 1.50% max., C 0.20% max.) $3.10.

Grainal: Vanadium Grainal No. 1, 93c; No. 6 63c; No. 79, 45c, freight allowed.

Vanadium Oxide: Contract, less carload lots $1.20 per lb contained V_2O_5, freight allowed. Spot, add 5c.

Tungsten Alloys

Ferrotungsten: (70-80%). Contract, 10,000 lb W or more, $2.25 per lb of contained W; 2000 lb W to 10,000 lb W, $2.35; less than 2000 lb W, $2.47. Spot, add 2c.

Tungsten Powder: (W 98.8% min.). Contract or spot, 1000 lb or more, $2.90 per lb of contained W; less than 1000 lb W, $3.

Zirconium Alloys

12-15% Zirconium Alloys: (Zr 12-15%, Si 39-43%, Fe 40-45%, C 0.20% max.). Contract, c.l., lump, bulk 6.6c per lb of alloy, c.l. packed 7.35c, ton lot 8.1c, less ton 8.95c. Delivered. Spot, add 0.25c.

35-40% Zirconium Alloy: (Zr 35-40%, Si 47-52%, Fe 8-12%, C 0.50% max.). Contract carload, lump, packed 20.25c per lb of alloy ton lot 21c, less ton 22.25c. Freight allowed. Spot, add 0.25c.

Boron Alloys

Ferroboron: (B 17.50% min., Si 1.50% max., Al 0.50% max., C 0.50% max.). Contract, 100 lb or more, 1" x D, $1.20 per lb of alloy. Less than 100 lb $1.30. Delivered. Spot, add 5c F.o.b. Washington, Pa., prices 100 lb and over are as follows: Grade A (10-14% B) 75c per pound; Grade B (14-18% B) $1.20; Grade C (19% min. B) $1.50.

Borosil: (3 to 4% B, 40 to 45% Si), $4.25 per lb contained B, f.o.b. Philo, O., with freight not to exceed railroad freight allowed to destination.

Bortam: (B 1.5-1.9%). Ton lots, 45c per lb; smaller lots, 50c per lb.

Carbortam: (B 1 to 2% contract, lump, carloads 9.50c per lb, f.o.b. Suspension Bridge, N. Y., frt allowed same as high-carbon ferrotitanium.

Other Ferroalloys

Ferrocolumbium: (Cb 50-60%, Si 8% max., C 0.4% max.). Contract, ton lot, 2" x D, $3.50 per lb of contained Cb, less ton $3.55. Delivered. Spot, add 10c.

Ferrotantalum—Columbium: (Cb 40% approx., Ta 20% approx., and Cb and Ta 60% min. C 0.30 max.) ton lots, 2" x D, $2.67 per lb of contained Cb plus Ta, delivered; less ton lots $2.72.

CMSZ Mixes: (No. 4—Cr 45-49%, Mn 4-6%, Si 18-21%, Zr 1.25-1.75%, C 3-4.5%; No. 5—Cr 50-56%, Mn 4-6%, Si 13.50-16.0%, Zr 0.75-1.25%, C 3.50-5%). 12 M x D, carload packed 19.0c per lb of material, ton lot 19.75c, less ton 21.0c. Delivered.

Silcaz Alloy: (Si 35-40%, Ca 9-11%, Al 6-8%, Zr 3-5%, Ti 9-11%, B 0.55-0.75%). Carload packed, 1" x D, 43c per lb of alloy, ton lot 45c, less ton 47c. Delivered.

SMZ Alloy: (Si 60-65%, Mn 5-7%, Zr 5-7%, Fe 20% approx.). Contract, carload, packed, ½" x 12 M, 16.5c per lb of alloy, ton lots 17.50c, less ton 18.5c. Delivered. Spot, add 0.25c.

Graphidox No. 4: (Si 48-52%, Ca 5-7%, Ti 9-11%). C.l. packed, 17.00c per lb of alloy; ton lots 18.00c; less ton lots 19.50c, f.o.b. Niagara Falls, N. Y.; freight allowed to St. Louis.

V-5 Foundry Alloy: (Cr 38-42%, Si 17-19%, Mn 8-11%). C.l. packed, 14.25c per lb of alloy; ton lots 15.75c; less ton lots 17.00c, f.o.b., Niagara Falls, N. Y.; freight allowed to St. Louis.

Simanal: (Approx. 20% each Si, Mn, Al). Lump, bulk, carload 11.00c. Ton lots, bulk 11.50c, packed 11.75c. Less ton lots, packed 12.25c per lb of alloy, f.o.b. Philo, O., with freight not to exceed railroad freight allowed to destination.

Ferrophosphorus: (23-25% based on 24% P content with unitage of $3 for each 1% of P above or below the base); carloads, f.o.b. seller's works, Mt. Pleasant, or Siglo, Tenn., $65 per gross ton.

Ferromolybdenum: (55-75%). Per lb, contained Mo, f.o.b. Langeloth and Washington, Pa., furnace, any quantity $1.13.

Technical Molybdic-Oxide: Per lb, contained Mo., f.o.b. Langeloth and Washington, Pa., packed in bags containing 20 lb of molybdenum, 95.00c.

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Metalworking Briefs

CONSTRUCTION, ENTERPRISE ORGANIZATIONAL CHANGES

California

Consolidated Engineering Co., Pasadena, Calif., plans to build a plant on S. Sierra Madre Villa avenue, that city. The firm makes electronic instruments.

California

San Francisco Brewing Corp. plans to add two more floors to its San Francisco warehouse at a cost of $300,000, as part of the firm's $2.2 million expansion program. The company has just opened a $1.5 million stock house and is erecting a $400,000 office and garage building.

California

W. R. Ames Co., large San Francisco metal fabricator, is expanding into new quarters large enough to increase its production and storage space 40 per cent.

California

Edward E. Conn Saw & Tool Works has moved to a larger plant in San Francisco, about twice the size of its former facilities.

California

All offices and manufacturing facilities of **Merit Products Inc.**—contour sandingwheels—have been moved from Los Angeles to 4023 Irving Pl., Culver City, Calif. Harry Pokras is general manager of the firm.

California

Food Machinery & Chemical Corp., San Jose, Calif., acquires the **Shur-Rane Irrigation Co.,** Azusa, Calif., manufacturer of portable irrigation systems. The equipment will be made by Food Machinery in its San Jose plant.

Delaware

Wabash Leasing Corp.—machinery, tools, etc.—has been granted a charter by the state of Delaware. Corporation Trust Co., Wilmington, Del., is serving as the principal office.

Delaware

North American Motors Inc.—motors—has filed a charter of incorporation in Delaware. Capital of the firm is listed at $150,000. United States Corp. Co., Dover, Del., is serving as the principal office.

Illinois

Paramount Compressor Corp. was organized in Chicago to take over the manufacture of an improved all-purpose, portable air compressor formerly made by the **Compressor Corp. of America,** St. Joseph, Mich. The new firm's office and plant are located at 512 N. Sangamon St., Chicago 22.

Illinois

John C. Jensen Inc., Chicago export sales firm, was appointed to handle export sales by the Portable Tools Division, **Cummins Business Machines Inc.,** Chicago.

Illinois

Gray Iron Foundry Division, **Hansell-Elcock Co.,** 485 W. 23rd Pl., Chicago 16, completed a new pattern storage building to replace facilities destroyed last year by fire. The building is equipped with overhead cranes and unit heaters and provides year 'round temperature controlled storage for customers' pattern equipment. The project, along with recently installed sand system and speed slinger and additional molding machines, is part of an overall program of mechanization amounting to some $300,000.

Louisiana

Republic Supply Co., Houston, Tex., opened a new store at Harvey, La., and a sales office at New Orleans. The Harvey store is managed by J. P. Smith II while the New Orleans office is under the direction of Jack Halbert. Both sales points are under the supervision of W. M. Haynes, refinery sales manager for Republic.

Maryland

Pilert & Sollinger, ornamental iron workers, is moving from 3321 East Fayette St., Baltimore, to 7556 Battle Grove Circle Rd., Baltimore county. The company specializes in iron railings.

Maryland

Logan Mfg. Co., screw machine products, has moved from 612 W. Ostend St. to 1231 Burgundy St., Baltimore. C. R. Sappington is owner.

Massachusetts

Johnson Steel & Wire Co. Inc., Worcester, Mass., is making all of its music wire from Swedish electric-furnace steel rod.

Michigan

McAleer Mfg. Co., Rochester, Mich., is renamed the Higbie Mfg. Co. No change in operations or personnel is involved. Four divisions will continue as operating entities: Avon Tube Division, Rochester; Bronson Reel Co., Bronson, Mich.; General Crafts Division, Rochester, and the McAleer Mfg. Division, Rochester.

Michigan

Industrial Electronics Inc., Detroit, forms a new Technical Service Center with William T. Bean Jr. as director.

Michigan

Adamas Carbide Corp., Harrison, N. J., opened a Detroit sales office at 22525 Hoover Rd., Van Dyke, a Detroit suburb. K. Preston Hockenbery is manager of this office.

New York

American Can Co. completed the removal of its general headquarters staff and facilities in New York from 230 Park Ave. to the new 36-story 100 Park Ave. Bldg., at 41st street.

New York

Eugene B. O'Connor has organized **O'Connor Abrasive Sales,** 277 Military Rd., Buffalo.

New York

Agaloy Tubing Co., Springfield, O., moved its New York office to 3205 Chanin Bldg., 122 E. 42nd St. T. L. Lee is the district manager.

New York

John Wood Mfg. Co. Inc., New York, has changed its name to John Wood Co. The plants at Conshohocken, Pa., and Chicago now are operating as the Heater & Tank Division.

New York

American Cyanamid Co., New York, forms a dyes and chemicals export department which will handle all foreign activities in connection with the products of the company's Calco Chemical Division (except pharmaceuticals), Industrial Chemicals Division, and Plastics and Resins Division. The combined department will be under the direction of Fraser M. Moffat Jr. H. E. Lorenz is man-

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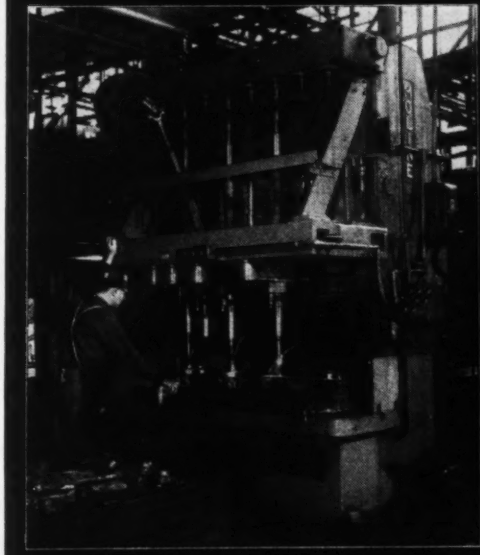

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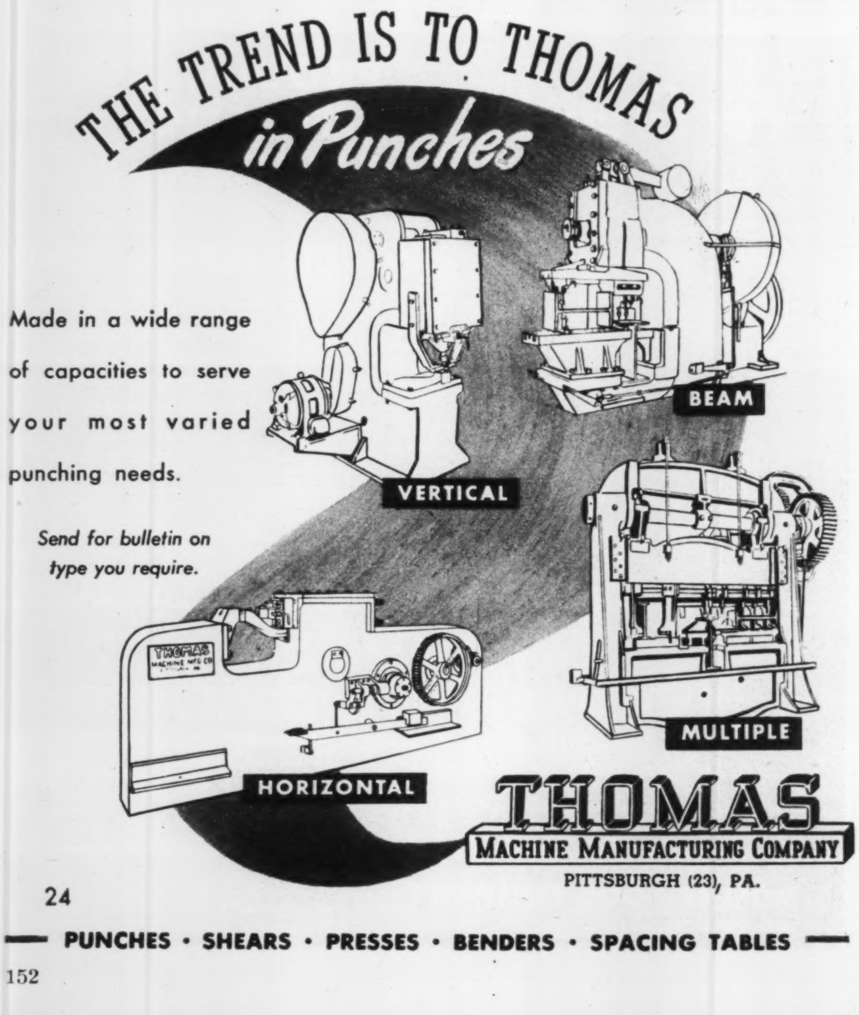

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— PUNCHES · SHEARS · PRESSES · BENDERS · SPACING TABLES —

ager of the eastern hemisphere; Henry W. Rojas, manager of the western hemisphere. J. L. Clark, formerly export sales manager of Calco Division, is assigned to special duties under Mr. Moffat.

Ohio

Libbey-Owens-Ford Glass Co., Toledo, is constructing a $250,000 addition to its factory on East Broadway. The company also is centralizing all manufacture of Vitrolite, colored structural glass, in its Rossford, O., plant. The company's Parkersburg, W. Va., plant is scheduled to cease operations on July 1.

NEA

WET WALL: One of the many precision tasks in assembling experimental vacuum tubes is that of coating the cathode with chemical materials that are good electron emitters. People at the Bell Telephone Laboratories, Murray Hill, N. J., do it by applying the coat with a spray gun in a wet-wall booth. The wet walls catch the excess spray and trap chemicals so they won't contaminate parts to be sprayed with other solutions

Ohio

E. I. du Pont de Nemours & Co., Wilmington, Del., will consolidate its paint division facilities in Cleveland in a $225,000 building to be started shortly at 3117 Chester Ave. The building is to be constructed for Haber, Schulist & Associates, National City Bank Bldg., Cleveland, and will be leased to Du Pont.

Ohio

S. & C. Aluminum Foundry has begun operations at 541 Sears St., Bucyrus, O. N. B. Swanson and V. D. Carrick purchased the building last January and installed new equipment.

Ohio

Ferro Enamel Corp., Cleveland, appointed Harry M. Platt, 2045 Pennsylvania Ave., Allentown, Pa., as industrial oven and dryer sales representative in eastern Pennsylvania.

Ohio

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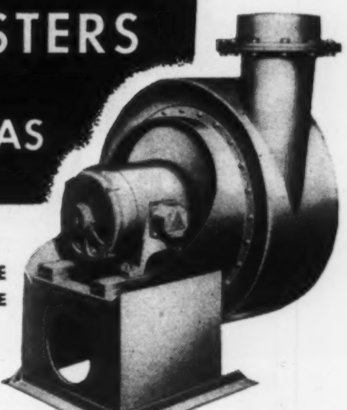

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